

THE SEAMANS KALENDER.

Or
An Ephemerides of the Sunne, Moone,
and certaine of the most notable
fixed Starres.

The ninth Edition.

Newly corrected and enlarged; with an abridged Table
of Sines, and some propositions thereupon, concerning
Arithmetickall Navigation.



LONDON,
Printed by EDVV: ALL-DE, for IOHN TAP, and are
to be sold at his shop at Saint Magnus corner.
Anno Dom: 1625.

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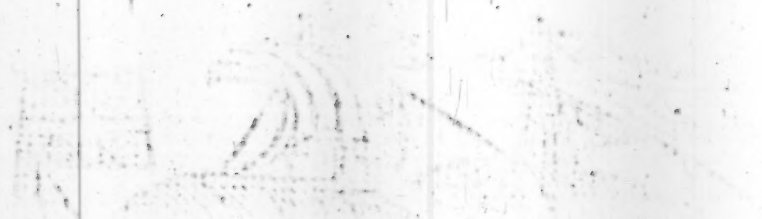
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LONDON

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1850



To the right VVorshipfull Sir I O H N
PAITON Knight, Gouvernour of his Majesties Isle
of Iersey, I. T. wishes worlds pleasures,
and heauens happinesse.



HEE Bee (*right worshipfull*) by *serious industrie* gathering a certaine hidden vertue from sundrie sortes of Flowers and Hearbes, and making thereof (by labour and trauaile) a materiall Lümpe, namely the Hony-combe: is not therefore to be condemned by any, but rather commended of all. The Phyition, of many simples making one compound medicine, doth not onely thereby reape profite to himselfe but applauditie to others, And the studious Reader, out of many Authors doth select some chiefe principles which hee recordeth as memorials, either to profite himselfe or to pleasure others.

Of these two comparisöns, the first is excellent for immitation in generall, the second very necessarie for diuers in paticular, and the last, (though not so highly esteemed of the common sort of people, by reason of their ignorance in Arts and Sciences, yet for the good that may come thereby to a Common-wealth) nothing inferiour to the best: especially, where their study tendeth to good and vertuous exercises, or the practise and contemplation thereof to laudable Artes and Sciences. Of which Artes, namely *Mathematicall*, Nauigation being a principall member, as hauing participation in *Arithmetike*, *Geometrie*, *Geography*, *Cosmography*, and *Astronomy*, or rather to say the truth, being the quintissence of them all, yea the proöfe and triall of them: for albeit that men reade or heare neuer so much of *Cosmography*, or *Astronomy*, yet without practise and experience it is vnperfect: and how can perfection bee attained but by sayling and transporting from place to place, thereby beholding the diuersities of dayes and nights, with the temperature of the Ayre in sundry Regions, whereby the

The Epistle Dedicatorie.

whole course and reuolution of the Sphere is made apparant to Mans capacitie? and by what meanes can Sayling bee performed but by Nauigation? which so being, it may be affirmed that as the *Mathematicall* Sciences are the grounds of Nauigation, so is Nauigation the onely meanes, whereby the excellencie of those Arts and Sciences, are proued and layd open, to the view of the world. Therefore very aptly may Artes bee tearmed the mirrour of Nature, because that by Artes, the wonderfull and hidden secrets of Nature are reuealed: And Nauigation may be called the tryall of Artes, being that thereby the whole study of Artes is prooued to be true. These reasons moouing me, as also being many times conuersant with Sea-men and Marriuers, whereby I perceiued what they (I meane the common and playner sort of them) chiefly desired: at my best leysure I made a collection of such Tables and Rules, as I thought fittest for their purposes: and being instantly vrged by diuers to publish them, although I was very loath to aduenture my simple laboures to the common view of carping censurers: yet at last (hoping well for the best, and not greatly respecting the worst) I resolued to hazard my papers to the Presse, and (as the common custome of the world is) thinking vpon a Patron, to protect it from the malicious slaunders of malignant spirits, I presumed vpon your Worships fauour in two respects: the one in consideration that your selfe being so well acquainted in the Artes *Mathematicall*, would (though not in respect of the Author, yet for affection to the matter) vouchsafe the protection of them: The other that being in duty bound to be at your Worships pleasure, I knowe not how I might shewe my selfe dutifully affected, better then by dedicating my (though vnpolisht yet well willing) laboures to your fauourable disposing, beseeching your Worship to accept of them, and to pardon my boldnesse; and so with my dayly prayers to God for your health and prosperous successe in all your

actions, I rest:

Your Worships most dutifully
to be commanded,

JOHN TAP.



*To the curteous Readers
health.*

Gentle and indifferent Readers,
whose judgements are not so Sophistically
mixed with humorous conceites, and quip-
ping quidities, (as many are now a daies) who
are apter with their turbulent tongues to condemne all
thinges, then with sensible iudgements to amend any
~~thing~~: as for them or any such carping Zoylistes, I am
indifferently perswaded to set as lightly by their partiall
and iniudiciall censures, as they are farre from hauing a
good opinion of ought but what is agreable to their
owne fantastickall fictions: Onely to them that are of more
plausible spirits and grauer iudgements, who (for the
most part in reading) applaude that which is good, and
passe ouer with silence that which is not hurtfull, with-
out scoffing at the worke, or deriding the Author; and
to those that hauing small vnderstanding, are desirous of
more knowledge in the Art of Nauigation, and other
Mathematicall studies: To the one I commit the cen-
suring of my vvorke, and to the other the profit of my la-
bours: knowing that the vwise vvill rather vvinke at small
faults, then rashly reprove that vvich may profit others,
though not pleasure themselves: And though, (as I say)

To the Reader.

the curious and expert Mariners finde nothing herein conteyned which may fatisfie their expectation, yet I hope they will judge fauourably of my intention, and with pacience passe it ouer for affection to the Art it selfe, wishing charitably that my skill were answerable to my will: As for the meaner sorte whose experience haue not beene fitted with Artes rudiments, nor their judgements fined with demonstratiue illustration in the Mathematicall Sciences, but onely are now (as it were) setting themselues with willing mindes to learne what they before wanted, I make no question but as by these following Tables and Propositions they may reape profit, so accordingly, in yeelding friendly censures vpon mee and my workes, they shall answere my expectation, with a full recompence of my passed labours. And so I take

thee friendly Reader, to the practise of what fol-

loweth: hoping that as it may be pro-

fitable to all, so it can

no way be hurt-

full to any.

Yours to vse,

I. T. A. P.





Certaine Definitions, meete to be vnderstood of those
that will practise *Nauigation*.



Sphære or Globe, is a round Figure, made by the turning of halfe a Circle, till it end where it began to be moued; or a massy body inclosed with one platforme or surface: in the middle whereof is a pꝛicke, from which all lines drauene to the surface are equall.

Center, is the point or pꝛicke aforesaid, in the middle of a Sphære, Globe, or of

ther Circle.

Diameter, is a right line drauene through the Center, to the Circumference or surface of a Sphære or Circle to each side thereof.

Circumference, is a round Circle, equally distant on all sides from the Center thereof.

Surface or Superfices is the vpper part of any thing.

A Degree, is the 360. part of the Circumference of any Circle.

A Minute, is the 60. part of a Degree, being vnderstood of measure: but in time, a minute is the 60. part of an houre, or the fourth part of a Degree, 15. degrees answering to an houre, and 4. minutes to a degree.

The Pole, is a point or a pꝛicke imagined in the Heauens: whereof are two, the North Pole being the center, to a Circle described by the motion of the North Starre, or the tayle of the little Beare: from which point aforesaid, a line imagined to passe through the center of the Earth, and passing directly to the opposite parts of the Heauens sheweth the South Pole.

The Equinoctiall, is a great Circle imagined in the Heauens: also deuiding the heauens into two equall parts, and lying in the middle betwene the two Poles, being in compasse from West to East, 360. degrees, every degree of terrestriall measure, valuing 20. English leagues or 60. miles.

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The Meridian is a Great Circle deuiding the Equinoctiall at right angles into two equall partes, passing also through both the Poles and the Zenith: to which Circle, the Sunne comming twice euery 24. houres, maketh the middle of the day, and the middle of the night.

Note that euery place hath a seuerall Meridian, which doe all meete together in the Poles of the world.

Zenith, is a point or pricke in the Heauens, right ouer our heads, 90. degrees from the Horizon, as the Pole is 90. degrees from the Equinoctiall.

Nadir, is a point or pricke in the heauens vnder our fete, opposite to the Zenith.

Horizon, is a great Circle, deuiding that part of the Heauens which we see, from the other part we see not.

Azimuth, is a great Circle, crossing the Horizon at right angles as the Meridians doe the Equinoctiall, being as many as the Meridians: and as the Meridians concur and meete together in the Poles of the world, so doe the Azimuthes meete in the Zenith, which is the Pole of the Horizon.

Paralels, are Lines or Circles equally distant in all parts one from another, as all Circles of East and West are Paralel to the Equinoctiall.

Almicanterahs, are Circles paralel to the Horizon, being also Circles of Altitude or elevation, being that the Altitude of the Sunne, Moone, or Starres aboue the Horizon are described thereby: which Almicanterahs doe crosse the Azimuthes, as the Paralels or Circles of East and West doe crosse the Meridians.

The Tropickes, are two lesser Circles paralel to the Equinoctiall, limiting the bounds of the Zodiacke or the greatest declination of the Sunne on each side of the Equinoctiall. The Tropicke of Cancer Northward, and the tropicke of Copricorne Southward, whose distance from the said Equinoctiall are 23. degrees, and 31. minutes.

The Zodiacke, is a great Circle, crossing the Equinoctiall in two opposite places thereof, and swaruing Byas-wise therefrom towards either of the Poles, touching the tropicke of Can. on the North

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North part, and the tropicke of Capri. on the south part thereof. In the Zodiacke are the 12. Signes: viz. Aries, Tau. Gem. Can. Leo, Vir. Libra, Scor. Sagit. Capri. Aqua. Pisces, euery signe being 30. degr. in length, and 12. in breadth: through which signes the Sun passing, describeth a yeare, & the Moone passing likewise thorough the same makes a month; the 12. degrees that the Zodiacke hath in breadth, is allowed for the latitude of the Planets.

Eclipticke, is a Circle lying iust in the middle of the Zodiacke, out of which the Sun neuer goeth, but the Moone and other Planets are sometime on the one side, and sometime on the other side thereof, in which the head and tayle of the Dragon also is.

The head and tayle of the Dragon, are two opposite points in the Ecliptick line of the Zodiack, which goeth backward through all the 12. signes in 19. yeares: And when it hapneth that the Sunne and Moone are in Coniunction, in that place of the Eclipticke where the head or tayle of the Dragon is, then is the Sunne Eclipsed, and being in the opposition, the Moone being in either of the said points, the Moone shall be Eclipsed,

The Circle Articke, is a Circle which incloseth all those starres which doe neuer rise or set in any Latitude, but are alwaies aboue the Horizon where the North Pole is raised: the like is understood of the Circle Antarticke, where the South Pole is raised.

The Polar Circle, are two little Circles distant from the Poles of the World, so much as is the greatest declination of the Zodiacke from the Equinoctiall: in which Polar Circles are the Poles of the Zodiacke.

Colures are 2. great Circles passing through both the Poles, crossing one another in the said Poles at right angles, and deuiding the Equinoctiall and the Zodiacke into foure equall partes, making thereby the foure seasons of the yeare. The one Colure passing through the Equinoctiall points of Aries and Libra, sheweth the beginning of the Spring time and Autumne, which two times, the dayes and nights are equall. The other Colure passing through the two tropicall points of Cancer & Capricorne, sheweth the beginning of the Summer and Winter: at which two times, the dayes and nights are longest and shortest.

Altitude

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Altitude in the Heauens, is the height of any thing aboue the Horizon towards the Zenith.

Latitude, is the widenesse or distance of the Planets or Stars, from the Eclipticke, either Northward or Southward. Also Latitude is the distance of the Zenith of any place from the Equinoctiall, towards either of the Poles, which is alwayes equall to the height of the Poles of the same place.

Longitude, is length, and in the Heauens it is vnderstood the distance of any Starre or Planet, from the beginning of Aries to the place of the said Planet or Starre, or from the beginning of any signe to a certaine other part or degree of the same signe: Otherwise longitude in the earth, is the distance of the meridian of any place, from the Meridian which passeth ouer the Isles of Azores, where the beginning of longitude is said to bee: Longitude, is counted vpon the Equinoctiall, and Latitude vpon the Meridian.

Declination, is the declyning or distance of the Sun, Moone or Starres from the Equinoctiall, and is said to be North or South according to the Pole towards which it leaneth.

Amplitude, is the distance of the rising and setting of the Sun, Moone or Starres, from the true East or West point of the Compass vpon the Horizon.

Ascension, is the rising of any Star, or of any portion of the Eclipticke aboue the Horizon. Right Ascension, is the number of degrees and minutes of the Equinoctiall, which cometh to the Meridian with the Sun, Moone, Star, or any portion of the Eclipticke. Oblique Ascension, is the number of degrees of the Equinoctiall, which riseth or cometh to the Horizon with the Sun, Moone, Star, or any portion of the Eclipticke: In which sort is Oblique Descension also. Ascensionall difference, is onely the remainder, the one being substracted or taken from the other.

The Golden number or Prime, is the time of 19. yeares: in which time the Sunne and Moone maketh all varietie of their Coniunctions, Oppositions, and other Aspects.

Epact, is the 11. dayes and 6. houres, which are added to the yeare of the Moone, being 354. dayes, to make it equall with the yeare of the Sunne, which consisteth of 365. dayes $\frac{1}{4}$. By the

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the Prime is found out the Epact: and by the Epact is found out the age of the Moone.

The Circle of the Sunne is the number of 28. because that in 28. yeares, all the varietie of Dominicall or Sunday Letters and leape yeares, are expired, being that at the 29. yeare, the said Circle both begin againe: the vse of the which number is to finde out the Dominicall Letter for any yeare past, present or to come: Where note, that there is but 7. letters which serue for Sunday letters, viz. A B C D E F G, And albeit that in the dayes of the weeke, they proceede according to their naturall order of the Alphabet, yet in the yeares they goe back ward: as if G. be for one yeare, F. shall be for the next: and when it is Leape yeare (which is euery fourth yeare) then is there two Letters for the yeare, the first seruing from the first of January till St. Mathias day, which is then the 25. of February, and then the other Letter takes place, and serues till the end of the yeare.

To finde which number of the Sunnes circle, and consequently the Dominicall letter for the yeare proposed, to the yeare of our Lord, adde 9. that totall deuide by 28. and that which remaines is the Circle of the Sunne for that yeare: Then to know the Dominicall letter: note that the 28. yeare the dominicall letter is A. and is the third from the Leape yeare: therefore the first to begin withall againe, is G. F. because it is another leape yeare, and so counting the 7. letters backward, and euery fourth yeare counting 2. letters: that letter vpon which the number of the Sunnes circle ends, shall be the Sunday letter for the yeare proposed.

As for Example.

The yeare 1627. adding 9. thereto, it makes 1636. that being deuided by 28. the remainder is 12. the circle of the Sunne: then counting 12. letters backward according to order till I haue counted 12. places, beginning with G. F. thus: 1. G. F. 2. E. 3. D. &c. I finde that the 12. place ends vpon G. which I conclude to be the Dominicall letter for the year aforesaid: and it is the 3. yeare after leape yere.

And here is to be noted, that the Prime and Dominicall Letter, changes the first day of January, and the Epact the first day of March.

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To finde out the prime.

Deuide the yeare of our Lord by 19. and to that which remaineth after the diuision, adde one: the product is the prime number for all that yeare.

As for example.

I would know the Prime for the yeare 1627. deuide 1627. by 19. and you shall haue in the quotient 8. and after the diuision, there rests 12. vnto which if you adde one, it makes 13. which is the Prime for that yeare 1627.

To finde out the Epact.

Adde to the Epact of the yeare past 11. and if it passe 30. take away 30. and the product is the Epact for all that yeare: but otherwise, which is the better way: imagine three places vpon your hand, which for example let it be the 3. ioynts of one of your fingers, and call or name the first ioynt 10. the second 20. the third 30. then count the Prime number vpon the 3. ioynts aforesaid and going ouer them vntill you come to the end of the said Prime number, marke vpon which your Prime ends, and adding the number of the ioynt with the Prime, if they come not to 30. that shall be the Epact for all that yeare: if they passe 30. take away 30. and the remainder is the Epact, if it be iust 30. then is the Epact equall to the Prime.

As for Example.

The yeare 1627. the Prime is 13. and imagining the first ioynt of my finger to be 10. the second 20. the third 30. I count vpon the three ioynts 13. the Prime number, viz. vpon the first ioynt I tell 1. on the second 2. on the third 3. Againe on the first 4. the second 5. and so to 13. which is the Prime, ending vpon the first ioynt, which I call 10. therefore adding 10. the number of the first ioynt, makes 23. for the Epact of the yeare 1627. aforesaid.

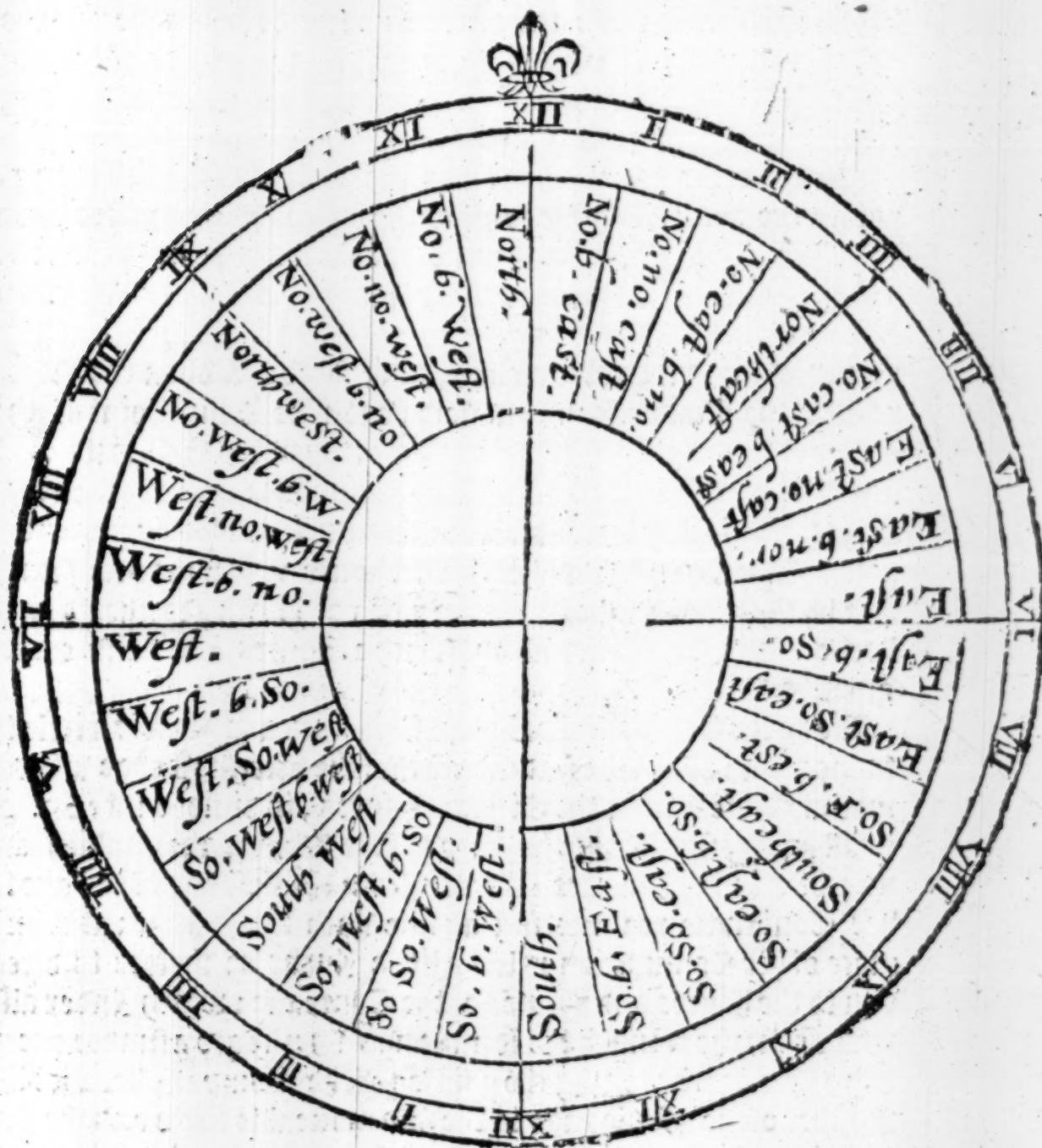
To knowe the Moones age.

Adde to the day of the month, the Epact, and so many dayes more as are months from March to the month you are in, including both months, and if they come not to 30. so much is the Moones age: but if they passe 30. take away 30. and the ouerplus is the Moones age.

This

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This is when the month hath 31. dayes, but if the month hath but 30. dayes, you must take away but 29. and the rest is the age aforesaid, for in those monthes that haue 31. dayes, the Coniunction is the 30. day of her age, and those monthes that haue but 30. dayes the Coniunction is the 29. day of her age.



A Decla.

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A Declaration of the former Instrument.

This Instrument giues you a plaine and easie order, for the shifting of the Sunne and Moone for euery day of her age: and also it is a ready and most necessarie reckoning of the Tides, whereby also is shewne the common order to bring thereby the 32. points of the Mariners Compasse to 24. houres of the day and night, which are the first rudiments to be learned of a young scholler or apprentice in Nauigation.

First, here is the common Mariners Compasse with the 32. points thereof plainly set downe, the names being printed vpon each seuerall point, which must bee perfectly learned without Booke: then is there in the vttermost edge, a circle deuided into 24. parts, which signifie 24. houres of the day and night, where you may see that twelue a clocke at night is iust vpon the North point of the Compasse: 12. at none vpon the South point of the Compasse, 6. a clocke in the morning, vpon the East: and 6. at night vpon the West point of the Compasse: and for the other pointes of the Compasse their agreeing with the heures, euery point of the Compasse makes $\frac{3}{4}$ of an houre as you may see North and by East is vpon $\frac{3}{4}$ of an houre past 12. North Northeast, one houre and $\frac{1}{4}$ Northeast and by North 2. houres and $\frac{1}{4}$ and consequently of the rest.

Also to the Center of the Compasse is fixed a moueable circle to turne round about the said Compasse: the vttermost edge wherof mouing close within the Circle of houres, is diuided into 29. equall parts, signifying the dayes of the Moones age, which are numbrzed in Arithmetical figures, from the first day of her age to her Coniunction or meeting againe with the Sunne: at which place of her Coniunction, is left a little Index or shewer to direct you to the houres and pointes of the Compasse: which Index also shewes you how much the Sunne and Moone are asunder euery day of her age, by telling the pointes of the Compasse betwixt the number of the Moones age in the said moueable circle and the Index thereof, accounting euery point for 11. degrees, $\frac{1}{4}$ or otherwise

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Write the number of houres contained in the vttermost Circle, betwixt the said number of the Moones age and the Index: accounting every houre for 15. degrees, shewes the degrees of distance betwixt the Sunne and the Moone.

Now to keepe a reckoning of the tides thereby, you must know by the Table hereafter set for that purpose, how it flowes: that is to say, what Moone makes full Sea or high water at that place where you would know the time of the tide or high water for the day proposed: which knowne, you must also by the former propositions, or else by the Kalender following, know the Moones age: then seeking out the number of the Moones age in the moueable Circle, place the said number of the Moones age vpon that point of the Compasse which makes full Sea vpon the change day at your place desired: and staying it there, the Index which is in the said moueable Circle, points you directly to the point of the Compasse that the Sun must be vpon, when it shall be high water the foresaid day in the desired place, and also in the vttermost fixed Circle it shewes the houre of the day which you desire.

An Example.

The first of January 1627. I desire all this aforesaid: first for the Moones age, because that the Epact changes not till the 1. of March, I adde the Epact of the last yeare before which is 12. & the day of the month 1. is 13 then January being the eleauenth month from March, 11. added thereto makes 24. for the Moones age the 1. of January, 1627.

Againe, to know how much the Sunne and Moone are asunder, the Moone being 7. dayes olde, I seeke in the moueable Circle for the Moones age, which being 7. I place 7. vpon a certaine point of the Compasse, which for example is here West, and the Index shewes the North and by west, and $\frac{3}{4}$ to the Northward, which is 7. points and $\frac{3}{4}$ that multiplied by a $11\frac{1}{4}$ the number of degrees that belong to a point of the Compasse, makes 87. deg. 12. minut. for the distance betwixt the Sunne and the Moone, & in houres it shewes 5. $\frac{2}{3}$ which multiplied by 15. yeelds the like, being very nere $\frac{1}{4}$ of the Zodiacke.

When for the tides, at London Bridge it flowes Southwest
and

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and Northeast, 02 is high water at 3. a clocke on the change day: therefore when the Moone is 7. dayes olde, I place 7. the Moones age, vpon the point Southwest 3. a clocke, and staying the moone, able rundle there I see that the Index shewes almost North west, which is 40. minutes nearest hand, 02 nere 3. quarters of an houre past 8. of the clocke, at which time it shall be high water at London bridge, the Moone being 7. dayes olde.

Againe, at Harwich where it flowes South and by East, the Moone 10. dayes olde, I lay 10. (the Moones age) vpon the point of the Compasse South and by East, and then the Index shewes the point West North west of the Compasse, and in the Circle of heures, of an houre past 7. which is the time of the full Sea, at Harwich, the Moone being 10. dayes olde.

But if you want a Table or instrument to worke the account of the tides, you may doe it by memozy, multiplying the Moones age by 4. and deuide the product by 5. and to the quotient adde for euery vuity which remaines vpon your diuision 12. min. that totall adde to the houre that it makes full sea on vpon the change day, the product shall be your desired number, as in the first example.

The Moone 7. dayes olde, and the high water at London on the change day: at 3. of the clocke. I multiply 7. (the Moones age) by 4. makes 28. that deuided by 5. the quotient is 5. and 3. remaines vpon the diuision, which 3. being so many times 12. min. makes 36. min. and added to 5. in the quotient, makes 5. houres 36. min. that added to 3. the houre of full Sea vpon the change day, makes 8. of the clocke and 36. minutes as aforesaid.

The gouernement of the Planets.

Diuers writers haue disagreed, concerning the Planitary houres, some making the houres of the Planets equall with the houres of the clockes, and so continuing their Regiment orderly with the other common houres. Some againe beginning the said Planitary houres at none, some at midnight, and some againe at the Sunne rising: which indeed for the time of the beginning of the account is the best, and for the difference of the equality and inequality betwene the planitarie houres, and the common houres of the clockes, Gemma Frisius agréing with the best

Astrono

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Astronomers saith, that as the dayes and nights doe increase or decrease, so must the Planetary houres be longer or shorter accordingly, neuerthelesse so that there shall be 24. planetary houres in the day and night, as well as of other houres, but that if the day consist of more then 12. houres, then proportionally the planetary houres to consist of more then 60. minutes: and if the day be lesse then 12. houres, then the planetary houres to be lesse then 60. minutes: and if the day be iust 12. houres, then the planetary houres are equall to the houres of the clockes and not otherwise. The like is to be vnderstood of the nights: and to make an equality of the planetary houres to them of the clockes, being that how long soeuer the day is, yet there must be but 12. planetary houres: and how short soeuer the day is, there must (neuerthelesse) be 12. planetary houres, and so of the night: by which you see that the planetary houres, are sometimes greater and sometimes lesser then the common houres of the clockes, which alwayes consist iust of 60. minutes, therefore if you deuide the day into 12. equall parts, one of those parts shall be the quantity of a planetary houre, which you may doe thus: multiply the houres of the day into minutes by 60. and if there be any odde minutes, adde them to the product, the totall being deuided by 12. the quotient shewes the number of minutes contained in an vnequall or planetary houre.

And againe, if at any hours of the day or night you know not what planetary houre it is, that is to say, how many planets haue ruled since the beginning of the day or night proposed: multiply the number of the houres past from Sunne rising by 60. and deuide the product by the number of the minutes contained in an vnequall or planetary houre, the quotient will shew you how many houres and minutes of the Planets are past from the Sunne rising (if it be in the day) or from Sunne setting if it be in the night: which knowne, enter the Table following to know what Planet rules the day and houre proposed, looking for the houre desired in that colume which is right vnder the day proposed: those Planets which are gouernours of the said houres in the day time, being placed on that side next the left hand, and the gouernours of the night on the right hand.

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Example.

The 17. day of May being Sunday at 9. of the clocke in the morning, I would know what Planet rules? First in the following Kalender, I finde that the 17. of May the day is 16. houres long, therefore I multiply 16. houres by 60. minutes, and the product is 960. that divided by 12. brings in the quotient 80. minutes for the length of a Planetarie houre at

Governours of the day,	Sunday,	Munday,	Tuesday,	Wednesday,	Thursday,	Friday,	Saturday,	Governours of the night.
Sol,	1	12	9	0	10	0	11	Iupi.
Venus,	2	0	10	0	11	1	12	Mars,
Mercurie	3	0	11	1	12	2	0	Sol,
Luna,	4	1	12	2	0	3	0	Ven.
Saturne,	5	2	0	3	0	4	1	Mer.
Iupiter,	6	3	6	4	1	5	2	Luna,
Mars,	7	4	1	5	2	6	3	Satu.
Sol,	8	5	2	6	3	7	4	Iupi.
Venus,	9	6	3	7	4	8	5	Mars,
Mercurie,	10	7	4	8	5	9	6	Sol,
Luna,	11	8	5	9	6	10	7	Ven.
Saturne,	12	9	6	10	7	11	8	Mer.
Iupiter,	0	10	7	11	8	12	9	Luna,
Mars,	0	11	8	12	9	0	10	Satur.

that time: then from 4. of the clocke (the time of the Sunnes rising) till 9. a clocke, the houre proposed is 5. houres, which multiplied by 60. brings 300. that divided by 80. (the length of a Planetarie houre) brings in the quotient 3. houres and 3. quarters: so I conclude, that at 9. of the clocke, 3. Planets have past their Regiment, and the 4. hath ruled 3. quarters of his houre: therefore under the title Sunday in the top of the Table, I look for 4. toward the foote of the said table, against which on the left hand is placed Luna, therefore I say that the 17. of May being Sunday, at 9. of the clocke in the morning, Luna shall have reigned 3. quarters of her houre.

A Rut-



*A Rutter, for the Courses round about
Ireland, from Cape to Cape, and vwhat tides
it makes in euery Harbour, and how many
leagues it is from Harbor to
Harbor.*

Ipprimis, from Cape-cleare to the Mison-head, is 7. leagues, and lyeth west and by North, and East and by South, you shall finde a Hauen north west from Cape-cleare, called Crooke Hauen, and it floweth there East northeast, and west south west, you must goe west to enter into it.

From the Mison to the Durzib, is 7. leagues, and lyeth West north west, and east southeast.

Beare Hauon lyeth from the Mison-head, north north west 3. leagues and a halfe, you must goe north west into the Hauen, it floweth east northeast and west south west: if you will anker betwene the Durzib and the maine Land, you must goe aboord the Island, for the east side is not sound.

The 3. Islands that be of the point of the Dowrzies, which is called the Bull, the Cow and the Calfe, they be sound, you may goe within them or else betwene them, for there is no danger but what you see.

Dowrzies, and Blaskey, lye North and by west, and south and by east, and there is betwixt them 12. leagues, the Skellocks is betwene both, and it floweth north east and south west.

North east of the great Skellocks a 2. leagues off, you shall finde the entry of Vallens, you must runne east southeast to enter in, it floweth east north east, you must borrow of the Island to enter

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in, for the point of the easter side is long.

North northeast of the great Scellocks, 6. leagues off, you shall finde the Hauen of the Ventry which is a good Road: It floweth east northeast.

N. E. by N. of the great Scellocks, 7. leagues, you shall finde the hauen of Dinggell, and without the hauen is a rocke called the Croo, which is sound on both sides: the rocke doth not couer but on a spring tide: you must run northwest and by west into the hauen, it floweth east northeast and west southwest.

The Ventry and the sound of Begue lyeth south by east, and north by west 3. leagues, and when you are past into the sound of Begue, you must lye east and by north into the roade against a red clift which is on the south side.

Southeast of the sound of Blaskey, a 6. leagues off, you shall finde a good harbour named Begue, which is to the northeast of Valence: The said Hauen hath two entrees, but the west side is the best: You must take great heede of a sunke rocke that is on the Islands side, which you must leaue on your Larbord side going in, and it floweth East northeast and west southwest.

You shall vnderstand, that the said sound of Blaskey lyeth southeast and northwest, but you must take heede of a sholde that is on the east side athwart the Sezebras.

From Blaskey to Smerrick is 3. leagues, and if you enter into the hauen, you must goe southwest into it: It floweth east northeast and west southwest.

There is a hill to the eastward of Smerrick, which is called Sinbrandon, goe from Smerrick east northeast, and you shall goe with Lopus head, which maketh entry of the riuer of Lymeric, on the north side: there is from one to the other 10. leagues.

Smerrick and the head of the Kerry, lye east northeast and west southwest, 7. leagues a sunder, and there is within the Bay three Islands called Salline.

From Lawpshead to the Seatiyes is 7. lea. they lie E.N.E. and W.S.W. and if you enter into the riuer, take heede of a sholde halfe way betwene Lawpshead and an Island called Statrick, which
you

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you must leaue on the South side, and to the Eastward of that Island is a good road: it floweth east northeast, and west south-west.

From Scattricke to Quoine, is five Leagues, you must goe East, and you shall finde two Islands, they be flat Islands, goe you to the northwards hard aboard them, and from thence runne East northeast, and you shall finde a Rocke called the Bieffe, goe hard aboard the South side of the said Rocke called the Bieffe. And when you are at the said Rocke, you must rowe south-east, and you shall finde another Rocke called the small Bieffe, then goe with the Island of the entrie of Dorsey, and borrow aboard the Island, as neare as you can, for feare of the Banke going into the Hauen, and you must moore at the Castle by foure Cables, for there goeth a great tide, it floweth east northeast and west south-west.

The sound of Blaskey, and the Islands of Arrin, lyeth North northeast, and south south-west, and there is betweene them 16. leagues: the Islands lye east and west, and makes the entrance of Galloway and of the other Islands: there is one which is naught, but the west sound is good, and the next sound to it is good, which is called the little sound, but the sound comming from the East is naught, but the next comming to the Black-shore from the east is partly good, but you must put the two particions to the Island, for it is dangerous: You must vnderstand that there is one Island in the course way, betwixt Lampshed and the entry of Galloway, that hath a great Ranie, a League and a halfe of the maine land.

If you goe before the towne of Galloway, goe aboard the Black-shore, and bying the Blackshore Southeast of you: then goe northeast, and you shall fetch the Island called Motton Island, and there is betweene them both three leagues: you must not trust to the north shore, for there is a shold halfe way to the Black-shore, and the Island of Motton is thwart of two white points, which is on the north side.

The said sholde is vpon the west south-west side of the said Island of Motton a league and a halfe off at a spring tide, then shall you

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for it drye, and it floweth at the said Island, East northeast and west southwest.

The sound of Saint Gregory and the Rode of Galue lyeth East northeast and west southwest, and there is betwixt them 8. leagues.

The sound of S. Gregory and Siluis head, lyeth Southeast and northwest, and the distance betwixt them is 9. leagues.

Slinshed and Sarke lyeth north by west, and are distant 15. leagues.

Black-rock is an Island which is west of a Kill-head, a league of the Cape: the said Black-rock and the Staggs lyeth northeast and by North, and are distant 12 leagues.

From the saide Black-rock, runne North and you shall finde the Island of Cast Eues, and there is betwene them 2. leagues.

South southwest of the Staggs there is a Haven called Broad-hauen, from the Haven to the Stagge is 2. leagues: the Staggs is a Cape that maketh the entrie of the Riuer of Raffin, they lyeth East and west, and are distant 8. leagues: the Staggs and the Cape of Tellen lyeth northeast & Southwest and are distant 15 leagues.

Betwixt the Staggs and the Cape of Tellen in the Bay is the Haven of Moy, the Haven of Portway, the Haven of Slego, the Haven of Ballechennen, the Haven of Dongall, the Haven of Kellekeg, and the Haven of Tellen.

The Cape of Tellen, and the Island of Arron, lyeth North northeast, and south southwest, and are distant 7. leagues.

The Island of Raghlenborne, and Tellen, lyeth southwest and northeast and are distant 2. leagues.

The Island of Raghlenborne, and the Island of Torre, lyeth North northeast and South southwest, and are distant 14. leagues.

To the Eastward of Torre, is a Cape called Horne-head, and are distant 2. leagues: southeast of Horne-head is a Haven called Sheep-hauen, it floweth East and west, but you shall haue in the Bay a good roade for all Windes: the said Haven is a broad Haven, and is two leagues from the Cape.

Horne-

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Horne-head and the entry of Loughfoyle, lye East northeast, and west south west, and are distant 6. leagues.

The entrie of Loughfoyle, and the Island of Enerster-houlde, lyeth Northeast and Southwest, and are distant five leagues.

The Island of Torre, and the Island of Enerster-houlde lyeth East and by North, and West and by South, and are distant 9. leagues.

The entrie of Loughfoyle, and Enerster-houlde, lye Southeast and northwest, and are distant 5. leagues.

The Isles of Enerster-houlde, and Skirris Portrush, lye East southeast and West northwest, and are distant 10. leagues.

You must vnderstand that the Riuer of Loughfoyle lyeth from Skerries Portrush, West southwest, and East northeast, and there is betwixt them, the Riuer of the Band: there is betwixt Portrush and Loughfoyle, 5. leagues: There is in the entrie of Loughfoyle, a Sand which is called the Tonnes, which is dangerous for any Ship of charge, also there is a Channell of the East side of the Tonnes, hard aboard the shore, but you must haue your tide: It floweth East by South, and West by North: Skerries Portrush and it, lyeth south and north, and are distant 12. leagues.

Skerries Portrush, and the Islands of the Raghlines, lye North east and by east, and Southwest by west, and are distant five leagues, it floweth in Skerries East southeast, and west northwest, the flood cometh from the Eastward.

Off the Raghlines is a Cape called the faire Forland, and betwixt them is a league and a halfe, the faire Forland and the Knee lyeth South southeast, and North northwest, and are distant 9. leagues.

The faire Forland and Loughrian in Scotland, lye East southeast, and West northwest, and are distant 15. leagues.

There is betwixt the Knee and Carickuergus 5. leagues.

The point of Loughrian, and the Islands of Commoras off Scotland lye North and South, you must passe by Elliso, and by the Haven of Lambach a sunder 7. leagues.

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The point of Loughrian and Copnam Isles, lyeth Northeast, and southwest.

The Knee and the Roocke of the Maydens, lye northeast by north.

The Knee and Ellse in Scotland, lye Northeast by east, distant 10. leagues.

Loughrian in Scotland, and the moulds of Galue, lyeth south southeast, and north north west, and are distant 7. leagues.

The Mould of Galue, and the Calfe of Man, lye South south east, and North north west, and are distant 10. leagues.

The Compman Isles, and the roade Carricke Vergus lye East and west, and are distant 14. leagues, it floweth in the sound east southeast, and west North west.

Compman Isles and the point of the Moulens, lye south south east, and north north west, and are distant 7. leagues.

The point of the Moulens and the Isle of Lambay, lye south south west, and north north east, and are distant 21. leagues.

Lambay and Carlingford, lye north north west, and south south east, and are distant 18. leagues.

Lambay and the Isle of Dalke, lye south south west, and north north east, and are distant 5. leagues.

The banke of Wiclo beginneth thwart of the Forth of Dublin, and containe to the Isle of Tosker, they lye North by west, and south by east, and they lye in length 24. leagues.

Tosker and the point of the Grenord, lye East and by north, and west and by south, distant 2. leagues.

And when you are bound to the eastward of the Grenord, you must keepe the Mountaine of Washford aboue the lowe land, and so you shall goe cleare of all the dangers betwixt you & the Shore: and if you close the Mount with the lowe land, then you shall goe with the dangers.

Tosker and the Cape of Canwalk, lye south by east, and north by west 40. leagues.

Tosker and the Salts, lye East north east, and west south west, distant 6. leagues.

The Salts and Silly, lye South and North, and are distant thirty

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thirty three leagues.

The Salts and the Tower of Waterford, lye East and West, distant 5. leagues.

The Tower of Waterford and the Isle of Ballecutin, lye south west and by west, and northeast by east, but betwene the Tower of Waterford and Ballecutin, is a Haven called Yoghall, and a Sea-board it, is an Island called Capell Isle, & betwene Capell Island and Ballecutin is 4. leagues.

The Tower of Waterford and Heluick-head, lyeth east & west, distant three leagues.

Capell Island and the Island of Ballecutin, lye west southwest, and east northeast, and are distant 3. and a halfe leagues.

Ballecutin and Corke Haven lye West by South, and east by north, and are distant 3. and a halfe leagues.

Oyster Haven and the Old-head of Kinsale, lye southwest and northeast, distant 3. and a halfe leagues.

The Haven of Kinsale lyeth from the Old-head north north-east, and going in, you must keepe Bane Castle open of the west land.

The Old-head and Cape Cleare, lye west by south, and east by north, and are distant 4. leagues.

Cape Cleare and Silly, lye east southeast, and west Northwest, distant 50. leagues.

There lyeth from Fasten a Haven called Crocke haven, and is from it northwest, distant 4. leagues.

There is a Haven called Scoll haven, which lyeth from Fasten north and by west, distant 5. leagues.

There is a head-land, halfe way betwixt the Old-head of Kinsale and Baltemore, which is called Kendonetedo, and it lyeth northwest by west; from it is a good Haven called Clendor, there is a high Land to the Eastward, you must goe aboard that high land, and so into the Haven. There is a ranie of Rockes on the west land, that goeth to the eastwards, therefore keepe the east side, and when you come in, Anker before the Castle: there lyeth west northwest from the said head, a good Haven, called Castle-haven, 4. leagues from it, and if you come out into the Sea,
and

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and meete with the Staggs, you must goe northeast into Castle-hanen, and in the entrie there is an Island which you must leave on the East side of you, and another flat Island which you must leave on the west side of you: you may goe dry at low water from it to the maine, for it is very nigh to the West land, but be bolde on the easter Island, and goe right with a Chappell that lyeth on the East side of the maine Land, and when you are thwart of the Chappell, you shall see a Castle of the west side, and thwart of the Castle you may enter in 12. fatham: it is from the Staggs 3. and a halfe leagues.

You must vnderstand that the flood shootes from Dorze to the Old-head of Kinsale north northeast, and the ebbe to the contrary, and from the Old-head to the Tower of Waterford, Northeast and southwest, and from the Dourze to the northwards, North northeast and south southwest.

If you will goe in betwixt the Cash and the North-head of the grounds into Dalky, you must bring a round hill that standes like a Sugar loafe North northwest, and then you shall haue 10. fatham: It floweth southeast alongst the Channell and the barre of Poulbacke, there is eight fote water vpon it at lowe water, and 3. fatham at full Sea: your Barre lyeth South and North, and you shall haue in the roade of Poulback, 14. fote at lowe water.

To sayle from Dalky to the roade of Poulback, you must keepe a small Rocke open, a hand spicke length, and when you come to the Barre, you must lye west southwest vp into the roade within the Beacon, then must you Anker in 4. Fatham at high water, for there be two Hilles on the South side, a high hill and a lowe round hill, bring them both in one, and then you bee in the best of the Rode. A south southeast Done, makes a full Sea.

A Note



A Note for going into
Dublin.

If you come for Milford, you must leaue all the Ilands to the Westwards, and when you haue the Grasham Point north-west, then the Haven beareth north-east by north, & when you come into Dall Rode, you may ride in 3. fathom and a halfe at lowe water, it floweth East by North.

Milford goeth in close vnder Cowein and Scabon, to the Eastward, and when you come open of Milford, you shall see an Iland like the Mawstone, which lyeth on the East side, and in Dall rode you may ride for all windes, the Small lyeth from the Grasham 3. leagues, and betwixt them lyeth a ledge of Rockes, which is dry at lowe water, it lyeth midway, it is very dangerous coming betwene them.



A Gene-

The Sea-mans Kalender.

A Generall and Compendious tide-Table, shewing what Moone makes full Sea or high water, in all these places *following.*

Full Sea on the Coasts of *Zutphen, Friesland,*
Holland, Zealand, and
Norway.

A t the Iutlandish Isles be- fore the Rivers of Heuer, Fider, and Eluc.		land, Wyering, and Amster- dam.	S.W.
	S. and N.	Without the bankes of Flan- ders.	S.W.
At Ancuifen.	S. and N.	Dodrecht and Ziericke Sea.	S.W.
The Ile of Vrck before Delfe.		Rotterdam, and from Harlem to the River of Maes.	S.W.
Ile, at Emden, and all the shores of Flanders.	S. and N.	At Ward-house.	E. and W.
Before the Maers deepe.	E. and W.	At Brihac.	E.S.E.
At Hambrow and Antwerp.	E. and W.	Cape Gallant.	S. by E.
Underneath Holyland.	W.S.W.	The Hauens of Yorland and Norway.	S. and N.
At Egmount and Harlem.	S.E.	At Corpus Christi point.	S.S.W.
In the Bresond and Vourd.	W.S.W.	Before the Fen in the channel, at Horn, Edam, Ile of Gore, before the Maes, before Can- fer and Teruer.	S.S.W.
Before the Calsterne and we- stern entrances of the Ems, or river of Emden, before all the Coast of Friezland and the Flye.	E.S.E.	Before the Willing and all the Coast of Zealand.	S.S.W.
Before the Ghest of Texell.	W.S.W.	North Cape and Blangbrow.	S.W.
Upon the Flats of west Friez-		Foxe nose, & Saint Nicholas roads,	W.S.W.
			Full

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Full Sea on the Coast of *France*,
Spayne, and *Portugall*.

At Blacknefle, Armuy,
Rammekins, and Camfer.
S.S.W

Within the Fosse of Caen.
S.S.E

Calice road and Diepe. S.S.E

At Boleine, Calice, Grauelin, and
Dunkerk, halfe tide. S. and N

The Island of Basse. S.E

Within the Seine, before the
Calquets, before Garnesey.
S.E

Before Cherbotough and the
Rase of Blanquet. S. and N

At Newport halfe tide, S. and N

At Seine head. S.S.W

At Garnesey, and before Saint
Poul. W.b.S

Bellisle and Holly Ile. S.W.b.S

Without Vshant, and before
Burdeaux. E. and W

Brittaine, Penmarke, Poytou,
and Gascoine. S.W

Rase of Fountnes. S.W.b.W

Bloy, and S. Mathews. W.S.W

Abrowrath, and S. Malowes,
W.b.S

Before the Killiats. S.W

Portwisc, and before the River
of Burdeaux. S.W

From the Rase to the Pole-
head. S.W

Before the River of Naunts and
before the Bay. S.W

In the Bay within Vshant.
W.S.W

At the Sept. Iles, and at Calice
in the Craeke. W.S.W

Within the river of Roan, and
from the Polehead of Burde-
aux, to the Forland of Foun-
tains, before Brouage, in the
river within all the hauens
aforesaid, it floweth. s.w.b.w

At S. Iohn de Luze. S.SE

At Concalo, and Saint Malo.
E. and w

At Cape Saint Maries. E.b.E

On all the coast of Biskay, Ga-
lizia, Portugall, and Spaine,
it floweth south-west and
northeast.

Scotland.

In S. Magnes sound. S.E.b.E

At Faire Iles. S.E

In the Frith. S.S.E

Faire Ile Rodes. S.b.E

At Orkney. S.E

England.

At Barwick it flows. s.s.w

At the Staples halfe tide.
N.E.b.E

At Howncliffe foote, halfe tide,
N.E.b.E

At Flam.

The Sea-mans Kalender.

At Flambrow-head one quar-		Betweene Bridlington & Law-	
ter tide.	E.N.E	renas,	W.s.w
At the Shoo,	S.and N	Betweene Lawrenas and Cro-	
At Tinnmouth one quarter tide,		mer along the Well, halfe	
	S.W	tide,	E.and w
At the Sporne,	W.b.S	Betweene Cromer & Yarmouth	
Newcastle & Humber,	W.b.S	roade,	S.E
Winterton,	E.S.E	Betweene Laistow roade and	
Blacke tayle and the Nowre,		Orfordnes,	S.E.b.s
	S.b.W	Betweene Orford and Orwell	
Blackney & the Shields,	E.& W	waues.	S.s.E
Yarmouth,	S.E.b.E	Betweene the Naze and the	
Orford and Albrow,	S.E.b.S	Ware-head of Colne,	S.b.E
Whitbay and Robin-hoods bay.		At the west end of the Nore,	
	S.W		S.b.w
Before Hartlepole,	S.W	Rochester and Maldon,	S.b.w
Scarbrow one quarter tide,		At Grauesend,	S.s.w
	w.s.w	London and the middlest of the	
Hull and Lin halfe tide,	E.& w	Heads or straights,	S.w
Before Humbers mouth,	N.w	At the north Forlands,	S.s.E
At Burnham one quarter tide,		At Beachy,	S.and N
	E.and w	Seauen Cliffes,	S.E
Cromer,	s.E	In the Downes,	S.s.E
At Liestow quart.tide,	s.s.E	In the Camber and at Gore-	
Harwich and Douer,	s.s.E	end,	S.b.E
Harwich within,	s.b.E	At Cambernes & at the Needles,	
South Forland,	s.s.E		S.E.b.s.
Before Margate and Thames		In Cambernes roade,	S.s.E
mouth,	s.b.E	Portsmouth, Hampton and the	
Ligh and Kentish knock,	s.& N	Ile of Wight,	S.and N
Spits and along the Swine,		In the Offing from the North	
	s.and N	Forland to the South For-	
Between Tinnmouth and Flam-		land, it runneth halfe tide,	
brow-head,	s.w	and from the south Forland	
Betweene Flambrow-head and		to the Nasse, it runneth halfe	
Bridlington-bay,	s.w.b.w	tide, and halfe quarter tide,	
		and	

The Sea-mans Kalender.

and from the Nasse to Fairly
one halfe tide, and from Fair-
ly to Beachy one quarter tide
vnder other.

At Portland rode, E.S.E

At S. Ellens, S.E.b.E

Within the Race of Portland,
at Poole in the Haven, at
Home-head, and thwart of
Plimouth and Dartmouth.

S.E

At Waymouth, E. and W

At Farnmouth, Foy, Fourn, Plim-
mouth & Dartmouth. W.b.s

Bristow and Foulnes, E.b.s

At the Start, E.b.s

Moshole, W.S.W

S. Davids head, E. and w

Milford-haven, E.S.E

Ile of Man and Catnes, S.E

Three leagues off the shore, at
the Lizard to the shore, and
to the Lands-end, E.S.E

Within Torbay and in the bay
of Carnaruen, W.b.s

At the mouth of Seuerne, W.b.s

At the Moonles, W.b.s

From the Lizard to the Sor-
lings, W.b.s

Before Silly in the Channell,
E. and w

At Silly halfe tide, S.s.w

Within Mounts Bay, and in
the Sea of Wales and Se-
uerne, W.s.w

At Lundy and the Holmes of

Bristow, E. and w

In the Skeue betwene Silly
and Vshant, S. and N

Note that the floud sets in at
the East end of Wight till a
Southeast Moone: in the
roads of Dungenesse South
Southeast, but without in
the Channell a Southwest
Moone full Sea: from the
Seames, and in the broad
sound betwene it and V-
shant, the floud runneth
East northeast, and West
southwest.

Ireland.

At Caldy, W. by S
Waterford and Abermo-
rick, E. and w

At Cape-cleare, E.S.E

Macknells Castle, S.E.b.E

Dublin and Lambay. S.E.b.E

Dunbar and Kildien, S.E

Dungarnm, Kinsale, Corkea

Haven and Baltemore, W.s.w

The Sea-mans Kalender.

The Course of all the Coasts of Holland, Zealand, France, and Spaine, vpon what Point, and in what distance they are.

From the Ile of Texell vnto Egmont,	S.& by w.leagues 5.
From Egmont vnto the Maze,	S.s.w.l.11
From the Maze vnto the Wieling,	S.w.l.12
From the Wieling vnto the head of straight betwene Douer and Callice.	w.s.w.l.18
From the Ile of walkerren or Flushing vnto Calice,	s.w.& by w.l.22
From Blacknesse vnto Deepe,	s.s.w.l.12
From Deepe vnto Seyne-head, or the Riuer of Seyne,	w.s.w.l.11
From the Seyne-head to the Riuer of Cane,	s.w.l.8
From thence vnto Cape de la Hague,	N.w.l.12
From thence vnto the Caskets,	w.& by N.l.8
From the Caskets to Garnesey,	s.w.& by w.l.4
From Garnesey to St.Malo,	s.s.E.l.10
From Garnesey to the Sept Iles.	s.w.& by s.l.12
From the seven Iles to St.Poul.	w.s.w.l.8
From thence to the Fourné,	w.s.w.l.10
From the Caskets to the Fourné,	s.w.& by w.l.34
From the Fourné to St.Mathewes point,	s.s.E.l.7
From thence to Fontenau or Fonteynes,	s.& by E.l.7
From Vihant to the Seams, Seaboard it,	s.l.7
From Fontenau to the west Penmarques,	s.E.l.7
From thence vnto the Ile of Croy,	E.& by s.l.1
From the west Penmarques, to Bell Ile,	E.s.E.l.13
From thence to Heys somewhat more Easterly.	s.E.l.13
From thence againe vntil within Piquilier,	E.& s.l.16
From thence againe vnto Croyfall,	E.& by s.l.7
From Piquilier vnto Heys.	s.& by w.l.7
From Heys to the Kiliats,	E.s.E.l.7
From the Ile of Heys to Porthuis,	s.E.& by E.l.7
	From

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From St. Martins Island to the burning Ile,	S.E. & by E. 1.3
From the Burning Ile to the Oyfter banke,	S.s.E. 1.3
From St. Martins Ile to the Tower of Cordam,	S. & by E. 1.12
From thence unto Bayone,	S. & N. 1.28
From Bayone to Orio,	W.s.w. 1.5
From Orio unto St. Lon de Luz,	E.s.E. 1.6
From Orio unto St. Andrew,	W. & by s. 1.20
From St. Andrew to Cape de Pennas,	E. & w. 1.30
From Cape de Pennas to Ribadeo,	S.w. & by w. 1.12
From Cape de Pennas to Ortegall,	W. & by w. 1.20
From Ortegall unto Ribadeo,	E. 1.14
From Ortegall unto the Ile of Cizaega,	S.w. & by w. 1.13
From Cizaega unto Corona,	E.s.E. 1.6
From thence unto Cape Coriana,	W.s.w. 1.10
From Coriana to Cape Finisterre,	S. & N. 1.3
From Finisterre unto Bayone,	S.E. & by s. 1.14
From Bayone unto Port de Port,	S.s.E. 1.18
From Port de Port to Aueiro,	S. & N. 1.8
From Aueiro to Montega,	S.s.w. 1.5
From Montega unto Barlings,	S.w. 1.12
From Barlings unto Roxende,	S. & by E. 1.12
From Roxend to St. Vues point,	S.E. & by s. 1.8
From thence unto Cape of St. Vincent,	S. & N. 1.24
From thence unto Pharo,	E. & w. 1.14
From Pharo unto Lepe,	N.E. & by E. 1.12
From Pharo to Saltees,	E.N. 1.18
From Saltees to Chipiona,	S.E. 1.8
From Chipione to Calis malis,	S.E. 1.6
From Calis unto the Streight of Gibraltar,	S.E. 1.8
From Calis unto Cape de Cantin,	S.w. & by S. 1.60
From Cape de Cantin to the Ile of Madera,	W. 1.104
From Cape St. Vincent to Madera,	S.w. & b. w. 1.115
From Roxende to Madera,	S.w. 1.130
From Roxende to the Ile of Tercera,	W. 1.210

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The Courses of England, Ireland, and Scotland.

From Boecknes unto Leeth in Scotland,	S.S.w.leagues 28
From Leeth unto Barwicke,	S.s.E.l.8
From Barwicke unto the Holy Iles,	E.s.E.l.4
From S.Abbes head to the Casterne end of Farne Iles,	S.E.l.6
From the Iles of Farne to the Tees mouth,	S.s.E.l.16
From the Riuer of Tees to Flambrow-head,	S.E.& by E.l.14
From Flambrow-head to Blackney.	S.E.l.18
From Blackney unto Winterton,	S.E.l.8
From Winterton unto Lestoff,	S.& b.E.l.8
From Lestoff unto Orford Haven,	S.l.7
From Orford unto the Foreland,	S.s.E.l.13
From the Foreland to Douer,	S.l.5
From Douer to the Shingels, or the Nesse point,	S.w.& b.w.l.7
From the Nesse point unto the Beache,	W.s.w.l.6
From the Beache to the Ile of Wight,	W.& b.s.l.15
From Wight unto Portland,	W.& b.s.l.10
From Portland to the Start point,	W.s.w.l.14
From the Start unto Ramhead point,	W.N.w.l.6
From Ramhead unto Dodmans point,	W.s.w.l.8
From Dodmans to the Lizard point,	S.w.& b.w.l.6
From the Lizard to the Iles of Silly,	W.l.12
From the Lizard to the Lands-end,	W.N.w.l.8
From the Lands-end to the Ile of Lundy,	N.E.l.14
From thence unto the holmes of Bristow,	N.E.& b.E.l.16
From thence unto the Ile of Caldie,	W.s.w.l.25
From thence to the Iles of Salteys, on the Coast of Ireland,	W.N.w.l.20
From Salteys to Cape-Cleere,	W.s.w.l.25
From Cape-Cleere to the Ile of Dorsey,	W.l.12
From the point of Dorsey to the Iles Blakem,	N.N.w.l.16
From Blakem unto the Iles of Arran,	N.N.E.l.14
From the Iles of Arran to Galwicke, or the Galfe in Ireland,	E.N.E.l.6
	Of

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Of diuers and sundry Courses ouer the westerne Sea.

From the Texell on the Coast of Holland to Flamborough,	W.N.w.leagues 45
From Texell vnto Winterton in Norfolke,	west, l. 32
From the Ile of Texell vnto Lestoffe.	w.& by s.l. 28
From the Riuer of the Maze, in South Holland vnto Harwich,	west, l. 26
From the said Maze to the Foreland of England,	w.& by s.l. 25
From the Marsdeepe in North Holland, to the said Foreland,	Southwest, l. 36
From the said Marsdeepe to Calico,	w.& by s.l. 38
From Douer vnto Bulloigne.	S.E.l. 8
From Bulloigne vnto the Beache,	w.l. 16
From the Beache to Deepe in Normandy,	S.E.l. 18
From Deepe vnto the Ile of Wight,	E.S.E.l. 28
From Weight to the Seyne head or mouth,	S.E.l. 20
From the said Riuer of Seyne to Portland,	w.N.w.l. 30
From the Ile of Wight vnto the Caskets,	S.w.& by s.l. 14
From Garnesey vnto St. Malo in Normandy.	S.s, E.l. 8
From the Caskets to Portland,	N. & by w.l. 10
From the Caskets to the Start point,	w, N.w.l. 16
From the Start to the Sept Iles in Normandy,	S.s.E.l. 24
From the Start to St. Poul in Normandy,	S. & by w.l. 22
From St. Poul to Portland,	N.E. & b.N.l. 32
From the Fournes to Ramhead,	N.N.E.l. 28
From the Start point vnto Vshant,	S.w.& b.s.l. 32
From the Fournes to the Lizard,	S. & N.l. 22
From Vshant to the Iles of Silly,	N.N.w.l. 26
From the Sorlings to Milford Hauen,	N. & b.E.l. 25
From the Sorlings to Wexford in Ireland,	N.N.w.l. 34
From the Sorlings to Cape-Cleare,	N, w.l. 42
From Cape-Cleare to Cape de Finisterre,	S. & N.l. 130
From the Lizard to Cape de Finisterre in Galicia	S.s.w.l. 112

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From Vihant vnto the Ile of Cizarga in Galizia,	S.s.w.l.85
From Vihant to Laredo in Biscay,	S.s.E.l.85
From the Seame Rockes to St. Sebastian in Biscay, Southeast and by s. l. 10	S. & N.l.70
From Vihant againe to Cap de Pannas in Biscay,	S.w.l.75
From Belle vnto Ortegall in Galizia,	W.s.w.l.85
From St. Martins Ile to Ortegall,	S.w. & by w.l.24
From Ortegall to Cape de Coriana,	W.s.w.l.185
From Cape de Finisterre to the Iles of St. Michael,	N.w.l.26
From St. Michael to the Ile of Tercera,	Southwest and by.w.l. 190
From Cape de Finisterre to the Ile of Madera,	S.E.by E.l.60
From Madera vnto the great Ile of Canary,	S.E.by E.l.15
From Cape de Finisterre to Bayone in Galizia,	S. & N.l.50
From Cape de Finisterre to the Ile of Barlings,	S.s.w.l.170
From the Barlings in Portugall to the Ile Canary,	E.N.E.l.150
From the Ile of Madera to Calis malis,	S.w. & by s.l.65
From Calis to Cape de Cantin,	S. & N.l.62
From Cape de S. Vincent vnto Cape de Cantin,	Southwest and by w.l.120
From Cape de S. Vincent vnto the Ile of Madera,	E. & w.l.210
From Roxend in Portugall to the Ile of Tercera,	

The courses of Norway, Swedeland, and East Finland.

From Schuytenes to the Vesteen,	S. & by E.l.4
From Vesteen or Westone to the Iedder,	S.s.E.l.4
From the Iedder to the Vorsteen or Forstone,	S.E.l.5
From the Forstone to the Noes,	E.s.E.l.6
From the Noes vnto Reperwicke,	E.N.E.l.8
From Reperwicke to Mardon,	N.E.l.10
From Mardon vnto Iofferland,	N.E.l.8
From Iofferland to Langhesondt,	N.N.E.l.1
From Langhesondt to Eerderoer,	N.E. & by E.l.6
	from

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From Ferderoer vnto Soen water,	N.1.6
From Ferderoer vnto Roeghe,	N.N.E.1.4
From Ferderoer vnto Akerfond,	E.N.E.1.6
From Akerfond to Maesterland,	S.E. & by E.1.4
From Pater noster to Nydrinke,	S.E.1.8
From Nydrinke to Waerberghe,	S.E. & by E.1.4
From Waerberghe to Swedoroer,	S.s.E.1.6
From Swedoroer vnto Col,	S.s.w.1.3
From Col vnto Lapland,	S.E.1.3
From Lapland vnto Ween,	S.s.E.1.2
From Ween to Drakeriffe,	S. & by E.1.7
From Drakeriffe to Steden,	S. & by w.1.4
From Steden to the North end of Bornholme,	E. & by N.1.15
From Bornholme vnto Anno,	N. & by w.1.8
From Anno vnto the Rockes,	N.E.1.8
From the Rockes vntill within the Calmerfond,	N.N.E.1.10
From Calmerfond to the Sweedish Ionckfrow,	N.N.E.1.8
From Ionckfrow to Landfoort,	N.N.E.1.8
From thence vntill befoze Duryhauen.	N.E. & by E.1.8
From the Stockhoms Shares to Viewe of Abo,	N.E. & b. N.1.24
From View vnto Luns Vtschares,	E.N.E.1.28
From the Vtschares to the Ale Putfuagto,	E. & by N.1.30
From thence vnto Somere,	E. & w.1.9
From Somere to the Red-hole of Wiburgh,	N.E.1.9
From the Red-hole to Traelsand,	N.E. & b. N.1.2
From thence vnto Wiburgh.	leagues, 2

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The Depths and Soundings, neere diuers Prouinces. And first of Gascoigne, Poictou, and Brittaine.

VWithout the Riuer of Burdeaux, there is 14. Fathams depth, but when you come within the sight of Cordam Tower, 30. fatham.

Ouer against the Coast of Poictou, 16. leagues without Oleron you haue 35. fatham, but coming neare the land 8. leagues from the shore, you haue 35. fatham: In the Channell betweene Porthuis and Heys, it is 30. fatham, and as much in the Channell of Heys: as also betweens Heys and Balile, without the Channell is 35. fatham, but within 25. without Heys, two kennings off, there is found 45. fatham.

Twenty two leagues Southward of Belile, is 70. Fatham, but 9. leagues from the North west point of that Island, towards the Southwest is 60. fatham: and ouer against the midst of Belile, in 40. fatham depth you shall see Land. In your course betweene Belile and the Seames, you may come no nearer then 50. or 45. fatham: if you sayle from Belile West and by north: when you are against Gloyland, you shall finde 60. fatham depth, without and within the Rocks which stands off Gloyland to the Seawards you haue 40. fatham water, in 60. fatham depth without the west Penmarkes, you may sayle Northwest by west without the Seames, but by night come no nearer then in 55. fatham, for the ground is grosse and red sand full of red Flintes: halfe a league West southwest off the Seames, is a ledge of Rocks, where you haue 7. fatham depth, but betweens the Seames and the rocks is 50. fatham.

In the Channell betweene the Seames and Vshant, is 55. fatham depth, the ground is grosse and red sand, with little round Stones red and blacke: neare to Vshant is 45. fatham, but within it is of a variable depth: Southwest almost 6. leagues of Vshant, you

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you haue 70. fatham, and the ground is fine white sand, with little white shelles, and other small things like needles, and then is Vshant Cast from you, but if the sand be grosse and white, mingled with great and white shels, then it is Southeast to you, but if you doubt of these grounds, goe Northerly, if your sound be deeper, then are you towards the Seames, but if not so deepe, then are you in the Channell almost North of Vshant.

Betweene Vshant and Obueracke in the trade, it is 60. fatham depth: betweene Vshant and the Sorlings in the middle of the Channell there is 70. fatham: betweene the Seames and Vshant in 70. fatham water, the ground is of little blacke stones easie to be broken and of yellow earth and Clay, but if you finde red and hard sand, goe Northward till you happen on white sand mingled with long Croakes, and then you are in the Channell.

If from Cizarga you sayle North northeast, in the Spanish Seas towards Vshant, and finde your selfe in 80. fatham, you are 14. or 15. leagues off Vshant, but coming nearer, you shall haue 70. fatham water, and be 10. leagues from Vshant, but if you find the ground to be yellow shelles and little blacke stones, then are you towards the Seames, therefore you must with the tide beare off Northward to shun Vshant, untill you finde white sand, and things like needles, for such are the grounds of the Channell.

Betweene Vshant and the Ile of Bale, when you sayle at 4. fatham water, you are 4. leagues off the shoare, but by night come no neerer then 25. fatham: when you are two leagues off Obueracke, you shall finde 25. fatham depth, but 8. leagues off the Sept Ilands, you haue 55. fatham.

A league without the Rocks of Obueracke, there is a blinde or hidden Rocke, so that if you are to sayle vpon aboord betweene the Fournes and Obueracke, come no neare the blinde rocke then 40. fatham, but Castward you may sayle in 30. or 25. fatham.

If a Ship sayling W. S. W. and South west by W. of Silly, at 80. fatham water, be found to be vnder 49. degrees 15. minutes of Altitude, she is 26. leagues from land, and must goe East and by North till she get 66. fatham water, for then she is in the Channell betweene Silly and Vshant, and then if she be bound for

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England, the must saile more southward, and between the Lands end and the Lizard the shall haue 55. fathom depth.

The Soundings and grounds betweene *Ireland*,
England, and *Normandy*.

Three Leagues without the Isles of Dorsey neare Ireland, it is 45. fathom deepe: in the Channell betweene Dorsey and Cape-cleare is 42. or 43. fathom, the Channell from Cape-cleare to Saltees hath 45. fathom, but two Leagues off Ireland it hath but forty: betweene Saltees and Milford it is fortie foure fathom deepe, and betweene Lundy and Silly 38. fathom: In the mid-way betweene Silly and Milford is 44. but South of Silly 40. and 42. and neare England by the Lands end, the Channell is of 50. fathom deepe.

Comming from Cape Finister sayling *N. N. E.* if you haue 80. fathom, you are 20. leagues off the shoare, and the ground is small blacke stones with great red sand: In the same Course, when you haue but 60. fathom, you are within 12. or 14. leagues off the shoare, but shall not so soone kenne Land as you thinke for: you shall a great while haue 60. fathom: being at the *N.* partes of the Channell about Silly: betweene Vhaot and Silly, the channell is 70. fathom: on the *S.* side of Silly, the ground is small red stones, and fine white sand: Duer against the Lizard and Falmouth 4. leagues from shoare, is 52. fathom, betwixt Foy and Plimouth sound, in the Channell highest is 60. fathom between the Lizard and the Start, beare no neare the shoare then 35. fathom, you may cast Anker in the trade or Channell in 25. fathom, and so you shall lye within the Foreland streame: betweene Plimouth and the Sept-Iles in the midst of the Channell is 55. fathom, but 4. leagues *S. S. W.* off Plimouth is but 35. fathom, *S. S. E.* of the midland of the Start is 45. fathom, but from thence 5. or 6. leagues *S. E.* is 54. fathom, in the Channell betweene the Caskets and Portland is 40. fathom, and a league *N.* of the Ile of Aldernay is a hole or ptt. 80. fathom deepe, all the rest of the channell betweene Portland and Aldernay, is of equall depth, viz. 40. fathom:

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fathom: when you are within kenning of Portland, your sounding is 34. fathom, and 2. leagues off Wight 36. fathom: also 2. leagues Eastward of Beachy, betwene Picardy and Wight, the channell in the middest is 38. fathom, betwene Winchelsey and Picardy 24. fathom, the sholde betwene the heads called the Vrowenland, hath but 3. fathom and a halfe, but on the South side of it, is 24. fathom: and in all the saire way betwene Zealand and Douer, it is 24. fathom deepe.

Depths of the North Sea from the Foreland.

In the Channell from England, Foreland, and sands of Flaunders, you haue 24. fathom deepe: but 3. leagues p. W. by west, of the Countrey of Zierrickze called Botbrecke, it hath but foure fathom depth without the sholde: the channell of Zealand is 26. fathom: p. W. of Harlem, 8. or 9. miles within the Sea, there beginneth a shelve called De breede Verthien, reaching alongst the Coast of Holland to the plaine of Ameland, where it endeth: ouer against Harlem and Egimount, is 13. 14. or 15. fathom, and the ground is full of Dase, mingled with blacke sand like mustard seede: the said shelve hath 15. 16. or 17. fathom depth: betweene Texell and Vlyeland, where the ground is grosse red sand, 6. or 7. leagues from the shoare, for there the sholde is narrower then it is towards the South end of the Channell: without the sholde betweene Zealand and Texell is 26. fathom deepe, as farre as the sholde which the Fishers call Dog-sand. In the channell on Englands side, ouer against Yarmouth is 35. fathom, but against Flamborough and Scarborough point 38. fathom, whereas the white shelve called Dog-sand beginneth, reaching into the North Seas to the channell of Helichland: this sholde (where it is within kenning of Flamborough point) hath but 9. or 10. fathom, but when in the same sand you finde 12. fathom, then Texell is from you southeast, almost 30. leagues, but when you are come to 16. fath. then are you with 21. leag. south southeast of Vlyeland.

A Ship that comes from the Risse, finding 18. fathom depth
on

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on the aforesaid sand, is then 20. leagues South and by East of Vlyeland, but at 22. fatham, must then sayle towards the Vlye south and by west, and south southwest: but if in the Channell of Helichland, 24. or 26. fatham be found, then must you sayle south west and southwest by south, and then you come to the Schellingh, but if in Helichland sound you haue 27. fatham, then are you altogether to the eastward of it: betweene the Riffe and the Dogger-sand, the Channell is 26. fatham: without the channell westward it is 32. fatham deepe.

A Ship that comes out of the English Straights, or out of Zealand, hauing at the Riffe 24. fatham, is from the Naes in Norway 18. leagues North and by East, but hauing 20. fatham, is but 16. leagues from it North: and finding but 18. fatham, is then 18. leagues off it North by West: The course from thence to the Holmes, is 12. leagues North by East: from thence to the point of Scaghens 18. leagues Northeast by East, there is a Rocke of one fatham depth, Northeast, and Northeast by East of the Holmes, two leagues from shoare.

Depthes neere Iutland and Ameland.

In the Sea without Iutland, a mile from Dodenberg, is a banke called Reeke-horne, stretching out 8. leagues West by South in some places but three fatham deepe, and in some places may be sayled ouer, and become a Roade for a North west and a North winde in 20. fatham: from Ameland towards the Sea, the ground is grosse sand, red and blacke, mingled with shelles: thence Southwards in 16. fath. sayling 3. houres you shall come to the smooth Sea of Ameland, where the ground is fine sand, with shelles: North from Schellingh in 24. fatham, is fine white sand, and in 8. fatham white and blacke sand mingled. Vlyeland hath white sand with shelles, and thin blacke sand in 16. fatham depth: from the West end of Vlyeland is great and red sand mingled with blacke like vnto mustard seede: about five or seauen leagues from shoare, at the East end of Schellingh to Seawards, at 18. fatham is fine white sand mingled with blacke, hauing
in

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In it things like needles. Ouer against Borcke in the ~~Western~~ Emes 17. or 18. fatham depth, land may be seene: the ground is grosse grauelly sand: at 14. fatham may Ameland be kend, but Schellingh at 16, and Vlyeland at 15. or 16. fatham water. At the South Hooke of Texell, land may be seene at 16. fatham. Holland at 14. or 15. when you sayle within the shoold called the Breduerthien, which beginneth Southwest of Harlem, and stretcheth alongst the Coast of Holland, to the west end of Vlieland, it is 7. or 8. leagues from the shore.

Soundings and grounds neare the *Schaw.*

A Great league West by north from the Schaw, is 35. fatham depth: North northeast a great league off the corner of this point is 38. fatham, and when the point is South east from you, then you haue 17. fatham. Betweene this point and Leson, the Channell is 20. fatham deepe, and the ground like; clay or dirt: betwixt Anhout & Waersbergh, in the midst of the Channell is 22. fatham water: Betweene Leson and Anhout, the ground is fine and stony: neare Waersbergh is a shoald of 17. fatham depth: between Anhout and Coll is another shoald of 17. fatham, where sometime it is troublesome like a Whirle-pole.

Depths of the Eastenre Seas.

Betweene Oeland and Gothland, the soundings are vnequall, sometimes of 20. sometimes of 23. fatham, the ground grosse and blacke stony sand, like Pease: when the south end of Oeland is 2. leagues from you westwards, you haue 27. fatham, where also you may gage water: but when the Chappell of Sudernoor-den beareth West Southwest off you, then haue you 31. fatham, and ground fit to gage water: ouer against the Roccoe in the faire way is 52. fatham, and a clay ground, but fit for gaging: betweene the greater and lesser Carta is 14. fatham, vnder which is safe roade for ships, there is a shoald betweene Houberg and Ostergard

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Ostergard 24. fatham depth, the ground great red sand, but hardly from thence can you ken Gothland out of the top: there is also to the Eastward another holde of 36. fatham, which when you are past, you haue more then 40. fatham water: when the point of Righ is 3. leagues Southeast from you, then haue you 30. fatham: but when it is from you halfe a league South southeast, you haue but 15. fatham, the ground is white sand: but when it beareth west a small league from you, then you shall finde 16. fatham: ouer against Heel, halfe a league from the shore it is almost 3. fatham deepe: the rode for ships at Heel hath 25. fatham depth: betwene Moan and Falsterborne is 14. fatham depth, betwene Stead and Falsterborne, in the very Channell is but 12. fatham deepe, neare Falsterborne it is full of holds, but neare Stead you haue 13. fatham water: betwene Darkeriffe and Southolmen, which is more holdy, there is 5. fatham wanting two foot: from thence toward the sound it is something deeper, 6. 7. 8. 9. or 10. fatham.

A note of certaine and most dangerous places
in the Sea.

The principall and most perilous of all, is the Mael-stream-well or Slørpe, called the Mouskstreame: which lyeth on the backside of Norway in 68. degrees on the North side of an Island or Rocks called Weeray. This well draweth the water vnto it selfe during the whole floud (which is the space of 6. houres and 12. minutes) with such an indraught and force, and with such a voyse through the tumbling and falling of the waves & streames one vpon the other, that it is rather to wonder at then to write of. So that during that time, within the space of more then two leagues round about that Rocks of Mouske (vnder which that water floweth) no ship or other vessell may come neare, for they should to their vtter destruction be drawne into it and swallowed vp: but all the time of the Ebbe the water is so strongly cast vp againe, that no kinde of substance or Mettall, how heauy soeuer it be, can there sinke. So that our Northzen Fishers at that time

The Sea-mans Kalender.

timedoe with their Tollen or fishing Boates, take many and strange fojmed fishes, which they drawe into their Boates with Hookes and lines, which they haue ready layde for that purpose: for that during the Ebbe, they cannot retorne into the Gulph, nor get vnder the water by any meanes.

The Northerne people that inhabite about those Rокkes, doe thinke that that streame passeth away vnderneath a part of Norway, vnder the North bottome in East Finland: because that in that place there is likewise such a maelstreame (though not altogether so strong nor dangerous) where the like fishes are taken: and the water is in like sort troublesome, as it is vnderneath, and about the Rокke of Mouske.

Whereupon, many experimented Pilots, doe call the said Sloop the Pauell of the Sea, which causeth the courses of the Ebbs and Floods about all the Lands that are on this North side of the Equinoctiall, as the most conuenient place for that purpose, to spread the waters South, North, East, and West: that is to say, Northwardly towards the Pole Articke, South-easterly on the backside of Russia and Tartarie, towards the straight of the great South Sea called Mar del Sur, wherein the Spirits Islands (called the Molluccas, neare the Equinoctiall) are lying southward the North Sea of these Lowe Countries: As also on the backside of Scotland and Ireland, towards the Spanish and Atlanticke Seas, and towards the North-west beyond Izeland, towards Frobuschers Straights, where it is thought the way vnto Catay may be found.

There are moreouer to be feared vpon the Westerne Seas, very dangerous streames and Gulphes, as in the Race of Portland, where oftentimes hapneth such turning and tumbling of waues and streames, that the Ships which passe that way, are many times in great perill.

Moreouer, the Rad of Blanquert, betwéens Normandy and the Isles of Alderney, roareth and rageth so dangerously, that many Ships fall therein headlong, so deepe, that sodainly they are swallowed up and sunke to the very bottome.

The Race of Fountney is more dangerous then all the e, where
in

The Sea-mans Kalender.

in many small vessels and Barks of Britanny and of other Countreies, are sodainly deuoured and cast away: and the entrance of the Garrone, called the Riner of Burdeaux, betwene the Towers of Cordam, and the Southerne and Northerne Asses, is likewise very perilous, and many Ships doe often perish there, if the Pilots be not skilfull and well acquainted with the place.

And these aforesaid being the most full of danger, it behoueth each Pilot or Maister to haue especiall knowledge thereof, and great care to pzeuent the danger that may ensue vnto them thereby.

The yeares for which the Tables of the Sunnes place and Declination (following) serues.

First.	Second.	Third.	Leapeyear.
1625	1626	1627	1628
1629	1630	1631	1632
1633	1634	1635	1636
1637	1638	1639	1640
1641	1642	1643	1644
1645	1646	1647	1648

Here

Hereafter followeth a most excellent, necessarie and compendious Kalender, shewing the Prime, Epact, Dominicall Letter, Leape yeares and moueable Feasts, for 24. yeares; in cluſiuelly comprehending therewith the true day and houre of the Moones Coniunction or Change, for 19. yeares to come, with the true place of the Sun, and his Declination from the Equinoctiall, both Northwards, and Southwards vpon every degree thereof, through the 12. Months of the Year.

Year of our Lord	Prime.	Epact.	Letter Sunday	First Sunday in Lent.	Easter day.	Ascendi. day.	Whit- sunday.	Trinity Sunday.
1621	7	17	G	Febr. 18	Aprill. 1	May 10	May 20	May 27
1622	8	28	F	Mar. 10	21	30	Iune 9	Iune 16
1623	9	9	E	2	13	22	1	8
1624	10	20	D C	Febr. 15	Mar. 28	6	May 16	May 23
1625	11	1	B	March 6	Apr. 17	26	Iune 5	Iune 12
1626	12	12	A	Febr. 26	9	18	May 28	4
1627	13	23	G	11	Mar. 25	3	13	May 20
1628	14	4	E	March 2	Apr. 13	22	Iune 1	Iune 8
1629	15	15	D	Febr. 22	5	14	May 24	May 31
1630	16	26	C	14	Mar. 28	6	16	23
1631	17	7	B	27	Apr. 10	19	29	Iune 5
1632	18	18	A G	19	1	10	20	May 27
1633	19	29	F	Mar. 10	21	30	Iune 9	Iune 16
1634	1	11	E	Febr. 23	6	15	May 25	1
1635	2	22	D	15	Mar. 29	7	17	May 24
1636	3	3	C B	March 6	Apr. 16	25	Iune 4	Iune 11
1637	4	14	A	Febr. 26	9	18	May 28	4
1638	5	25	G	11	March 5	3	13	May 20
1639	6	6	F	March 3	Apr. 14	23	Iune 2	Iune 9
1640	7	17	E D	Febr. 23	5	14	May 24	May 31
1641	8	28	C	March 7	25	Iune 3	Iune 13	Iune 20
1642	9	9	B	Febr. 27	10	May 19	May 29	5
1643	10	20	A	19	2	11	May 21	May 28
1644	11	1	G F	Mar. 10	21	30	9	May 16

January hath 31. day es.

The Prime			Fast	Leng of y day.	True place and Declination			
					☉ in 1 st First yere		☉ in 1 st second year	
					H.M.	D.M.	D.M.	D.M.
viiij.7.	1	A	Newe	7 52	1 21 38	21 47	1 21 23	21 49
	2	B	yeares d.	7 54	2 22 39	21 37	2 22 24	21 39
2. xvj.	3	C		7 58	3 23 40	21 27	3 23 25	21 29
	4	D		8 0	4 24 41	21 16	4 24 27	21 18
v.8.	5	E	Fast	8 3	5 25 43	21 5	5 25 28	21 7
	6	F	Twelſe	8 6	6 26 44	20 53	6 26 29	20 56
I. xiiij.	7	G	day.	8 9	7 27 45	20 41	7 27 30	20 44
ij. 10.	8	A	Lucian.	8 12	8 28 46	20 29	8 28 32	20 32
x. 17.	9	B		8 15	9 29 47	20 16	9 29 33	20 19
	10	C		8 18	10 30 49	20 3	10 30 34	20 6
xviiij. 3.	11	D		8 21	11 1 50	19 49	11 1 35	19 52
vij. 4.	12	E		8 24	12 2 51	19 37	12 2 36	19 35
	13	F	Hilarr.	8 28	13 3 52	19 21	13 3 37	19 21
2. xv.	14	G		8 32	14 4 53	19 7	14 4 38	19 10
	15	A		8 36	15 5 54	18 52	15 5 39	18 55
iiiij. 2.	16	B		8 40	16 6 55	18 37	16 6 40	18 40
xij. 11.	17	C		8 43	17 7 56	18 21	17 7 42	18 25
ix. 5.	18	D		8 46	18 8 57	18 5	18 8 42	18 9
6. j.	19	E		8 49	19 9 58	17 49	19 9 43	17 53
	20	F	Fabian	8 52	20 10 59	17 32	20 10 44	17 36
	21	G	Agnes	8 55	21 12 0	17 15	21 11 45	17 19
6. xvij.	22	A	Vincent	8 58	22 13 1	16 58	22 12 46	17 2
	23	B		9 0	23 14 2	16 41	23 13 47	16 45
vj.	24	C		9 2	24 15 3	16 23	24 14 48	16 27
	25	D	Conuer.	9 4	25 16 4	16 5	25 15 49	16 9
3. xiiij. 2. ij	26	E	of Paul.	9 6	26 17 4	15 47	26 16 50	15 51
I. iij.	27	F		9 9	27 18 5	15 28	27 17 51	15 32
5. xj.	28	G		9 12	28 19 6	15 9	28 18 52	15 13
xix. 4.	29	A		9 15	29 20 7	14 50	29 19 52	14 55
i. viij.	30	B		9 18	30 21 8	14 31	30 20 53	14 35
	31	C		9 21	31 22 8	14 11	31 21 53	14 16

South Declination.

January.

of the Sunne.

☉ in y^r third yere

☉ in y^r Leap yere

D. M. D. M.

M. D. M. D.

1	21	9	21	51
2	22	10	21	42
3	23	12	21	31
4	24	13	21	21
5	25	14	21	10
6	26	15	20	59
7	27	16	20	47
8	28	18	20	35
9	29	19	20	22
10	☾	20	20	9
11	1	21	19	56
12	2	22	19	42
13	3	23	19	28
14	4	24	19	14
15	5	25	18	59
16	6	26	18	44
17	7	27	18	28
18	8	28	18	13
19	9	29	17	57
20	10	30	17	40
21	11	31	17	23
22	12	32	17	6
23	13	33	16	49
24	14	34	16	31
25	15	35	16	13
26	16	36	15	55
27	17	37	15	36
28	18	37	15	18
29	19	38	14	59
30	20	39	14	40
31	21	39	14	20

South Declination.

1	20	54	21	54
2	21	55	21	44
3	22	56	21	34
4	23	57	21	24
5	24	59	21	13
6	25	59	21	2
7	27	00	20	50
8	28	2	20	38
9	29	3	20	25
10	☾	4	20	12
11	1	5	19	59
12	2	6	19	46
13	3	7	19	32
14	4	8	19	18
15	5	9	19	3
16	6	10	18	48
17	7	11	18	33
18	8	12	18	17
19	9	13	18	1
20	10	14	17	44
21	11	15	17	28
22	12	16	17	11
23	13	17	16	53
24	14	18	16	36
25	15	19	16	18
26	16	19	16	0
27	17	20	15	42
28	18	21	15	23
29	19	22	15	4
30	20	23	14	45
31	21	24	14	25

Certaine of the most

notables fixed Starres of the
I. 2. and 3. bignesse; their
Magnitude, Declination,
and right ascention: where-
by you may readily finde
when any of them are in
rule for obseruation.

I

Whales tale, is a starre of
the third bignes, whose de-
clination is 20. degr. 12. mi-
nutes South, and the right
ascention thereof, is 24. mi-
nutes of an houre.

I

Whales backe of the third
bignes, declination 12. deg.
20. minutes South, and right
ascention 50. minutes.

3

Rams hozne, is a starre of
the third bignes, whose decli-
nation is 17. degrees 17. mi-
nutes North, and his right
ascention is 1. houre 32. mi-
nutes.

4

Rams head of the third big-
nes, declination 21. degrees
33. minutes North, right as-
cention 1. houre 46. min.

D

February

February hath 28. dayes.

The Prime.			Leng. of the day. H. M.	True place and Declination			
				☉ in the first yere.		☉ in the second yere.	
				D. M.	D. M.	D. M.	D. M.
2. viii.	1 D	Fast.	9 30	1 23	9 13	5 1	1 22 55 13 56
7. xvi.	2 E	Purific.	9 33	2 24	10 13	3 1	2 23 55 13 36
	3 F	of Mary	9 37	3 25	11 13	9	3 24 56 13 15
v.	4 G		9 41	4 26	11 12	50	4 25 56 12 55
xiii. 12.	5 A	Agathe.	9 45	5 27	12 12	29	5 26 57 12 34
	6 B		9 50	6 28	12 12	8	6 27 57 12 14
4. ii.	7 C		9 54	7 29	12 11	48	7 28 58 11 52
x.	8 D		9 58	8 30	13 11	36	8 29 58 11 31
	9 E		10 2	9 1	13 11	5	9 30 59 11 10
8. xviii.	10 F		10 6	10 2	14 10	43	10 1 59 10 49
2. vii.	11 G		10 9	11 3	14 10	21	11 2 59 10 27
	12 A		10 12	12 4	14 10	0	12 3 59 10 5
7. xv.	13 B		10 15	13 5	15 9	37	13 4 59 9 43
	14 C	Valent.	10 18	14 6	15 9	15	14 5 59 9 21
10. iii.	15 D		10 22	15 7	15 8	53	15 7 0 8 58
3. xii.	16 E		10 26	16 8	15 8	30	16 8 0 8 36
i. 6.	17 F		10 30	17 9	15 8	8	17 9 0 8 14
	18 G		10 34	18 10	15 7	45	18 10 0 7 51
5. ix.	19 A		10 38	19 11	16 7	22	19 11 0 7 28
xvii. I. I.	20 B		10 42	20 12	16 6	59	20 12 0 7 5
	21 C		10 46	21 13	16 6	56	21 13 0 6 42
	22 D		10 50	22 14	16 6	13	22 14 0 6 19
3. vi.	23 E	Fast.	10 54	23 15	16 5	50	23 15 0 5 56
xiii. I. I.	24 F	Mathias	10 58	24 16	15 5	27	24 16 0 5 32
2. iii.	25 G		11 2	25 17	15 5	3	25 17 0 5 9
xi. 5.	26 A		11 7	36 18	15 4	40	26 18 0 4 46
	27 B		11 12	27 19	15 4	16	27 19 0 4 22
I. xix.	28 C		11 16	28 20	15 3	33	28 20 0 3 58
	29						

South Declination.

when it is Leape yere February hath 29. dayes, and then is S. Mathias the 25. day.

February.
of the Sunne.

☉ in \approx third yere.

☉ in \approx Leap yere.

D. M.	D. M.
1 22 40	14 0
2 23 41	13 40
3 24 41	13 20
4 25 42	13 0
5 26 42	12 39
6 27 43	12 19
7 28 43	11 58
8 29 44	11 36
9 30 44	11 15
10 1 44	10 54
11 2 45	10 32
12 3 45	10 10
13 4 45	9 48
14 5 46	9 26
15 6 46	9 4
16 7 46	8 41
17 8 46	8 19
18 9 46	7 56
19 10 46	7 33
20 11 47	7 10
21 12 47	6 47
22 13 47	6 24
23 14 47	6 1
24 15 46	5 38
25 16 46	5 15
26 17 46	4 51
27 18 46	4 28
28 19 46	4 4

South Declination.

D. M.	D. M.
1 21 56	14 15
2 22 57	13 55
3 23 58	13 35
4 24 59	13 14
5 26 0	12 54
6 27 2	12 33
7 28 3	12 12
8 29 4	11 50
9 30 5	11 29
10 1 6	11 7
11 2 7	10 45
12 3 8	10 23
13 4 9	10 1
14 5 10	9 39
15 6 12	9 16
16 7 13	8 53
17 8 14	8 31
18 9 15	8 8
19 10 16	7 45
20 11 17	7 22
21 12 18	6 58
22 13 19	6 35
23 14 19	6 12
24 15 20	5 48
25 16 21	5 24
26 17 22	5 0
27 18 23	4 37
28 19 23	4 13
29 20 24	3 49

5

Bulls eye, is a starre of the first bignes, whose declination is 15. degr. 38. minutes South, and right ascension 4. houres 13. minutes.

6

Orions left foote, of the first bignes, declination 8. degrees 42. minutes South, right ascension 4. houres 55. minutes.

7

Orions left shoulder, of the second bignes, declination is 5. degr. 56. minutes South, right ascension 5. houres 4. minutes.

8

First, in Orions girdle, of the second bignes, declination 38. minutes South, right ascension 5. houres 12. minutes.

9

Orions right shoulder of the first bignes, declination 6. degr. 17. minutes South, right ascension 5. houres 34. minutes.

March hath 31. dayes.

The Prime			Leng. of the day	True place and Declination							
				in the First yeare.				in the second yeare.			
				H. M.	D. M.	D. M.		D. M.	D. M.		
	1	D	Dauid.	11 20	1 21	14	3 29	1 21	0	3 35	
7.viiij.	2	E		11 24	2 22	14	3 6	2 21	59	3 11	
xvj. 11.	3	F		11 28	3 23	13	2 42	3 22	59	2 48	
	4	G		11 32	4 24	13	2 18	4 23	59	2 24	
	5	A		11 36	5 25	13	1 54	5 24	58	2 0	
10. v.	6	B		11 40	6 26	12	1 30	6 25	58	1 37	
1. xiiij. 6	7	C		11 44	7 27	12	1 7	7 26	57	1 13	
	8	D		11 48	8 28	11	0 43	8 27	57	0 49	
8. x.	9	E		11 52	9 29	10	0 20	9 28	56	0 26	
xviiij. 7.	10	F		11 56	10 29	10	0 4	10 29	55	0 2	
	11	G	Gregor.	12 0	11 1	9	0 27	11 0	55	0 22	
	12	A		12 4	12 2	8	0 51	12 1	54	0 45	
8. viij.	13	B		12 8	13 3	8	1 15	13 2	53	1 9	
xv. 9.	14	C		12 12	14 4	7	1 38	14 3	53	1 33	
	15	D		12 16	15 5	6	2 2	15 4	52	1 56	
iiij.	16	E		12 20	16 6	5	2 15	16 5	51	2 20	
xij. 6.	17	F		12 24	17 7	4	2 49	17 6	50	2 43	
	18	G	Edward	12 28	18 8	4	3 13	18 7	49	3 7	
5. j.	19	A		12 32	19 9	3	3 36	19 8	48	3 30	
ix. 10.	20	B	Benedic.	12 36	20 10	2	3 59	20 9	47	3 53	
	21	C		12 40	21 11	0	4 22	21 10	46	4 17	
xvij. 6.	22	D		12 43	22 11	58	4 45	22 11	45	4 40	
vj. 11.	23	E		12 47	23 12	58	5 8	23 12	44	5 3	
	24	F	Fast.	12 50	24 13	57	5 31	24 13	43	5 26	
1. xiiij.	25	G	Annunti-	12 54	25 14	56	5 54	25 14	42	5 49	
iiij. 8.	26	A	ation of	12 58	26 15	55	6 17	26 15	41	6 12	
	27	B	Mary.	13 2	27 16	53	6 39	27 16	40	6 34	
9. xj.	28	C		13 6	28 17	52	7 2	28 17	38	6 56	
xix. 3.	29	D		13 12	29 18	51	7 25	29 18	36	7 19	
	30	E		13 18	30 19	49	7 47	30 19	35	7 41	
viiij. 10.	31	F		13 24	31 20	48	8 9	31 20	34	8 4	

South Declination.

North Declination.

March.							
of the Sunne.							
in a third yere				in a Leap yere			
D.	M.	D.	M.	D.	M.	D.	M.
1	20	45	3 41	1	21	30	3 23
2	21	45	3 17	2	22	30	3 0
3	22	45	2 53	3	23	30	2 35
4	23	44	2 30	4	24	29	2 12
5	24	44	2 6	5	25	28	1 49
6	25	43	1 42	6	26	28	1 25
7	26	43	1 19	7	27	27	1 1
8	27	42	0 55	8	28	26	0 38
9	28	42	0 31	9	29	26	0 14
10	29	41	0 8	10	Y	25	0 10
11	Y	40	0 16	11	1	25	0 34
12	1	40	0 40	12	2	24	0 57
13	2	39	1 3	13	3	23	1 21
14	3	38	1 27	14	4	22	1 44
15	4	37	1 50	15	5	22	2 8
16	5	37	2 14	16	6	21	2 32
17	6	35	2 37	17	7	20	2 55
18	7	35	3 1	18	8	19	3 19
19	8	34	3 25	19	9	18	3 42
20	9	33	3 48	20	10	17	4 5
21	10	32	4 11	21	11	15	4 28
22	11	31	4 34	22	12	14	4 51
23	12	30	4 57	23	13	13	5 14
24	13	29	5 20	24	14	12	5 37
25	14	28	5 43	25	15	11	6 0
26	15	26	6 6	26	16	10	6 23
27	16	25	6 29	27	17	8	6 45
28	17	24	6 51	28	18	7	7 9
29	18	23	7 14	29	19	6	7 30
30	19	21	7 36	30	20	4	7 52
31	20	20	7 58	31	21	3	8 15

South Declination.

North Declination.

10

The great Dog is a starre of the first bignes, whose declination is 16. degrees 12. minutes Southwards, and his right ascention 6. houres 27. minutes.

11

The little Dog is a starre of the first bignes, declination is 6. deg. 13. min. North, right ascention 7. houres 18. minutes.

12

Brightest in Hydra is a starre of the second bignes, declination 6. deg. 53. min. South, right ascention 9. houres 8. minutes.

13

Lyons heart of the first bignes, declination 13. degrees 55. minutes North, right ascention 9. houres, 57. minutes.

14

Lyons necke of the second bignes, declination 21. degrees 52. minutes North, right ascention 9. houres 46. minutes.

D 3

Aprill

Aprill hath 30. dayes.

The Prime.			Leng. of the day. H.M.	True place and Declination			
				☉ in V First yeare.		☉ in V Seccd year.	
				D.M.	D. M.	D.M.	D.M.
	1	G	13 30	1	21 46 8 31	1	21 32 8 25
xvj. 4.	2	A	13 34	2	22 45 8 53	2	22 31 8 48
	3	B	13 38	3	23 44 9 15	3	23 30 9 9
v.	4	C Ambro.	13 42	4	24 42 9 36	4	24 28 9 31
xiiij. 8.	5	D	13 46	5	25 41 9 58	5	25 27 9 53
7. iij.	6	E	13 50	6	26 39 10 19	6	26 25 10 14
x. 5.	7	F	13 53	7	27 37 10 40	7	27 23 10 35
	8	G	13 56	8	28 36 11 1	8	28 22 10 56
2. xviiij.	9	A	13 59	9	29 34 11 22	9	29 20 11 17
	10	B	14 2	10	32 11 42	10	31 18 11 37
vij. 8.	11	C	14 5	11	31 12 3	11	31 17 11 58
	12	D	14 8	12	29 12 22	12	29 15 12 18
2. xv.	13	E	14 12	13	27 12 43	13	27 13 12 38
iiij. 8.	14	F	14 16	14	25 13 2	14	25 11 12 58
	15	G	14 20	15	24 13 22	15	24 9 13 17
9. xij.	16	A	14 24	16	23 13 42	16	23 8 13 37
i. 9.	17	B	14 28	17	20 14 1	17	20 7 13 56
	18	C	14 32	18	18 14 19	18	18 4 14 15
ix. 2.	19	D	14 36	19	16 14 38	19	16 2 14 34
	20	E	14 40	20	14 14 56	20	14 0 14 52
2. xvij.	21	F	14 44	21	11 15 15	21	10 58 15 10
vj.	22	G	14 47	22	12 15 33	22	11 56 15 28
xiiij. 8.	23	A S. Geor.	14 50	23	13 15 50	23	12 54 15 46
	24	B Fast.	14 53	24	14 16 8	24	13 51 16 3
7. iij.	25	C S. Mark.	14 56	25	15 16 25	25	14 49 16 20
xj. 2.	26	D	14 59	26	16 16 42	26	15 47 16 37
	27	E	15 2	27	16 59 16 58	27	16 45 16 54
7. xix.	28	F	15 5	28	17 56 17 14	28	17 43 17 11
	29	G	15 8	29	18 54 17 30	29	18 40 17 26
vij. 2.	30	A	15 12	30	19 52 17 46	30	19 38 17 42

North Declination.

April,
of the Sunne.

☉ in Y third yeare.				☉ in Y Leap yeare.			
D. M.		D. M.		D. M.		D. M.	
1	21	18	8 20	1	22	3	8 37
2	22	17	8 42	2	23	1	8 59
3	23	16	9 4	3	24	0	9 21
4	24	14	9 26	4	24	58	9 32
5	25	13	9 47	5	25	57	10 4
6	26	11	10 9	6	26	55	10 25
7	27	10	10 30	7	27	54	10 46
8	28	8	10 51	8	28	52	11 7
9	29	6	11 12	9	29	50	11 27
10	30	4	11 32	10	30	59	11 48
11	1	3	11 53	11	1	47	12 8
12	2	1	12 13	12	2	45	12 28
13	3	59	12 33	13	3	43	12 48
14	4	57	12 53	14	4	41	13 7
15	5	55	13 11	15	5	39	13 27
16	6	54	13 32	16	6	38	13 47
17	7	52	13 51	17	7	36	14 6
18	8	50	14 10	18	8	34	14 25
19	9	48	14 29	19	9	32	14 43
20	10	46	14 48	20	10	30	15 1
21	11	44	15 6	21	11	28	15 20
22	12	42	15 24	22	12	26	15 37
23	13	39	15 41	23	13	24	15 55
24	14	37	15 59	24	14	21	16 12
25	15	35	16 16	25	15	19	16 29
26	16	33	16 33	26	16	17	16 46
27	17	31	16 50	27	17	15	17 3
28	18	29	17 7	28	18	13	17 19
29	19	26	17 23	29	19	10	17 35
30	20	24	17 38	30	20	8	17 50

North Declination.

15

Lyons backe is a starre of the second bignes, who's declination is 22. degrees 43. minuts Southward, and his right ascention is 10. houres 52. minutes.

16

Lyons tayle of the first bignes, declination 16. degrees 50. minutes South, right ascention 11. houres 29. minutes.

17

Rauens wing of the third bignes, declination 15. degrees 16. minutes South, right ascention 11. houres 56. minutes.

18

Virgins spike of the first bignes, declination 19. degrees South, right ascention 13. houres 5. minutes.

4

May

May hath 31. dayes.

The Prime		East.	Leng. of the day H. M.	True place and Declination									
				☉ in 1 st yeare.				☉ in 2 ^d yeare					
				D. M.		D. M.		D. M.		D. M.			
1. viij.	1 B	Phil. &	15 16	1	20	50	18	2	1	20	36	17	58
6. xvj.	2 C	Jacob.	15 20	2	21	47	18	17	2	21	34	18	13
v. 9.	3 D	Inuenti.	15 23	3	22	45	18	32	3	22	31	18	28
	4 E	croffe.	15 26	4	23	43	18	46	4	23	29	18	43
8. xij. ij. 4	5 F		15 29	5	24	40	19	0	5	24	26	18	57
	6 G	Io. Port.	15 32	6	25	38	19	14	6	25	24	19	11
4. x.	7 A	Latin.	15 35	7	26	35	19	28	7	26	22	19	25
	8 B		15 38	8	27	33	19	41	8	27	19	19	38
xvij. 9.	9 C		15 40	9	28	30	19	54	9	28	17	19	51
	10 D		15 42	10	29	28	20	7	10	29	14	20	3
3. vij.	11 E		15 44	11	30	25	20	19	11	30	12	20	16
xv. 8.	12 F		15 46	12	1	23	20	31	12	1	10	20	28
	13 G		15 48	13	2	20	20	42	13	2	6	20	39
8. iij.	14 A		15 50	14	3	18	20	53	14	3	4	20	51
xij.	15 B		15 53	15	4	15	21	4	15	4	1	21	2
	16 C		15 56	16	5	12	21	15	16	4	59	21	12
ij.	17 D		15 58	17	6	10	21	25	17	5	56	21	22
	18 E		16 0	18	7	7	21	35	18	6	53	21	32
6. ix.	19 F	Dunstan	16 3	19	8	5	21	44	19	7	51	21	42
xvij. II.	20 G		16 6	20	9	2	21	53	20	8	48	21	51
vj. 8.	21 A		16 9	21	9	59	22	2	21	9	45	22	0
	22 B		16 12	22	10	56	22	10	22	10	43	22	8
8. xiiij.	23 C		16 14	23	11	54	22	18	23	11	40	22	16
iiij. I.	24 D		16 16	24	12	51	22	25	24	12	37	22	23
	25 E		16 18	25	13	48	22	32	25	13	35	22	31
IO. xj.	26 F	August	16 20	26	14	45	22	39	26	14	32	22	37
xix. 6.	27 G		16 22	27	15	43	22	45	27	15	29	22	44
	28 A		16 24	28	16	40	22	51	28	16	26	22	50
	29 B		16 26	29	17	37	22	57	29	17	24	22	56
8. viij.	30 C		16 27	30	18	34	23	2	30	18	20	23	1
xvi. 6.	31 D		16 28	31	19	31	23	7	31	19	18	23	6

North Declination.

May.

of the Sunne.

☉ in 3 third year.

☉ in 8 Leap year.

	D.	M.	D.	M.
1	20	22	17	54
2	21	20	18	10
3	22	17	18	24
4	23	16	18	39
5	24	13	18	54
6	25	10	19	8
7	26	8	19	21
8	27	5	19	35
9	28	3	19	48
10	29	0	20	0
11	29	58	20	13
12	II	55	20	25
13	I	53	20	37
14	2	50	20	48
15	3	47	20	59
16	4	45	21	10
17	5	42	21	20
18	6	39	21	30
19	7	37	21	40
20	8	34	21	49
21	9	32	21	58
22	10	29	22	6
23	11	36	22	14
24	12	33	22	22
25	13	21	22	29
26	14	18	22	36
27	15	15	22	42
28	16	12	22	48
29	17	10	22	54
30	18	7	22	59
31	19	4	23	4

North Declination.

	D.	M.	D.	M.
1	21	6	18	6
2	22	3	18	21
3	23	1	18	36
4	23	58	18	50
5	24	56	19	4
6	25	54	19	18
7	26	52	19	32
8	27	49	19	45
9	28	46	19	57
10	29	44	20	10
11	II	41	20	22
12	I	39	20	34
13	2	36	20	45
14	3	33	20	56
15	4	31	21	7
16	5	29	21	18
17	6	26	21	28
18	7	23	21	37
19	8	20	21	46
20	9	18	21	55
21	10	15	22	4
22	11	12	22	12
23	12	9	22	20
24	13	7	22	27
25	14	4	22	34
26	15	1	22	41
27	15	58	22	47
28	16	56	22	53
29	17	53	22	58
30	18	50	23	3
31	19	47	23	8

19

Arcturus or betwixt boots
thighes, is a starre of the first
bignes, whose declination is
21. degrees 20. min. North,
and his right ascension is
13. houres 56. minutes.

20

South Balance of the se-
cond bignes, declination 14.
degrees 14. minutes South,
right ascension 14. houres
55. minutes.

21

South Balance of the se-
cond bignes, declination 7.
degrees 46. minutes South,
right ascension 14. houres,
55. minutes.

22

Scorpions heart is a starre
of the first bignes, whose de-
clination is 25. degrees 25.
minutes South, right ascen-
tion 16. houres 6. minutes.

June

June hath 30. dayes.

The Prime.			Leng. of the day. H. M.	True place and Declination			
				☉ in II First yere.		☉ in II secōd yere.	
				D. M.	D. M.	D. M.	D. M.
	1 E		16 28	1 20 29	23 11	1 20 15	23 10
8. v.	2 F		16 28	2 21 26	23 15	2 21 12	23 14
1. xiii.	3 G		16 29	3 22 23	23 18	3 22 9	23 17
7. ii.	4 A		16 19	4 23 20	23 21	4 23 6	23 21
x. 10.	5 B	Bonifac.	16 29	5 24 17	23 24	5 24 4	23 23
	6 C		16 29	6 25 14	23 26	6 25 1	23 26
xviii. 6.	7 D		16 30	7 26 11	23 28	7 25 58	23 28
	8 E		16 30	8 27 9	23 30	8 26 55	23 29
vij. 8.	9 F		16 30	9 28 6	23 31	9 27 52	23 30
	10 G		16 30	10 29 3	23 31	10 28 49	23 31
9. xv.	11 A	Barnaby	16 30	11 30 0	23 31	11 29 46	23 31
11. iij.	12 B		16 30	12 31 57	23 31	12 31 43	23 31
xij. 10.	13 C		16 30	13 1 54	23 31	13 1 40	23 31
	14 D		16 30	14 2 51	23 30	14 2 38	23 30
	15 E		16 30	15 3 48	23 28	15 3 35	23 29
9. i.	16 F		16 30	16 4 45	23 26	16 4 32	23 27
ix. 9.	17 G		16 29	17 5 42	23 24	17 5 29	23 25
	18 A		16 29	18 6 38	23 21	18 6 26	23 22
xvii. 2.	19 B		16 28	19 7 37	23 18	19 7 23	23 19
8. vi.	20 C	Edward.	16 27	20 8 34	23 15	20 8 20	23 16
xiii.	21 D		16 26	21 9 31	23 11	21 9 17	23 12
ii. 11.	22 E		16 25	22 10 28	23 7	22 10 14	23 8
	23 F	Fast.	16 24	23 11 25	23 2	23 11 11	23 3
xi. 3.	24 G	Iohn Ba.	16 23	24 12 22	22 57	24 12 8	22 58
	25 A		16 22	25 13 19	22 51	25 13 6	22 53
3. xix.	26 B		16 20	26 14 16	22 45	26 14 3	22 47
	27 C		16 18	27 15 14	22 39	27 15 0	22 41
viii. 4.	28 D	Fast.	16 16	28 16 11	22 32	28 15 57	22 34
	29 E	S. Peter.	16 14	29 17 8	22 25	29 16 54	22 27
8. xvi.	30 F		16 13	30 18 5	22 18	30 17 51	22 20

North Declination.

Iune.									
of the Sunne.									
in II thir yere.					in II Leap yere.				
D.	M.	D.	M.		D.	M.	D.	M.	
1	20	2	23	9	1	20	44	23	12
2	20	58	23	13	2	21	42	23	16
3	21	55	23	17	3	22	40	23	19
4	22	53	23	20	4	23	36	23	22
5	23	50	23	23	5	24	33	23	25
6	24	47	23	25	6	25	30	23	27
7	25	44	23	27	7	26	27	23	29
8	26	41	23	29	8	27	24	23	30
9	27	38	23	30	9	28	21	23	30
10	28	35	23	31	10	29	19	23	31
11	29	32	23	31	11	29	17	23	31
12	29	30	23	31	12	1	13	23	31
13	1	27	23	31	13	2	10	23	30
14	2	24	23	30	14	3	7	23	29
15	3	21	23	29	15	4	4	23	28
16	4	18	23	27	16	5	1	23	26
17	5	15	23	25	17	5	58	23	23
18	6	12	23	23	18	6	55	23	21
19	7	9	23	20	19	7	52	23	17
20	8	6	23	17	20	8	49	23	14
21	9	2	23	13	21	9	47	23	10
22	10	0	23	9	22	10	45	23	5
23	10	58	23	4	23	11	41	23	0
24	11	55	22	59	24	12	38	22	55
25	12	52	22	54	25	13	35	22	50
26	13	49	22	48	26	14	32	22	44
27	14	46	22	42	27	15	29	22	37
28	15	43	22	36	28	16	26	22	31
29	16	40	22	29	29	17	23	22	23
30	17	37	22	22	30	18	21	22	16

North Declination.

23

Hercules head is a starre of the third bignes, whose declination is 14. degrees 57. minutes North, and right ascension 16. houres 56. minutes.

24

Eagles heart is a starre of the second bignes, declination 7. degrees 54. minutes North, right ascension 19. houres 32. minutes.

25

Dolphins taylor of the third bignes, declination 10. degrees North, right ascension 20. houres, 16. minutes.

26

Goates taylor of the third bignes, declination 17. degrees 51. minutes South, right ascension 21. houres 27. minutes.

July

July. hath 31. dayes.

The Prime.			Leng. of the day.	True place and Declination					
				in the First yere.			in the second yere.		
				H. M.	D. M.	D. M.	D. M.	D. M.	D. M.
2. v.	1	G	Visitati.	16 12	1	19 22 10	1	18 48 22 12	
xiiij. 8.	2	A	Mary:	16 10	2	19 59 22 2	2	19 45 22 4	
ij. 7.	3	B	Martin.	16 8	3	20 56 21 53	3	20 43 21 55	
	4	C		16 6	4	21 53 21 44	4	21 40 21 46	
x.	5	D		16 4	5	22 51 21 35	5	22 37 21 37	
	6	E		16 1	6	23 48 21 25	6	23 34 21 28	
4. xviiij.	7	F		15 57	7	24 45 21 15	7	24 31 21 18	
	8	G		15 54	8	25 42 21 5	8	25 29 21 7	
9. viij.	9	A		15 51	9	26 39 20 54	9	26 26 20 56	
xv.	10	B		15 48	10	27 37 20 43	10	27 23 20 45	
iiiij. 8.	11	C		15 46	11	28 35 20 31	11	28 20 20 34	
	12	D		15 44	12	29 31 20 19	12	29 17 20 22	
3. xij.	13	E		15 41	13	28 20 7	13	28 15 20 10	
	14	F		15 38	14	1 26 19 55	14	1 12 19 58	
i. 6.	15	G	Swithin.	15 35	15	2 23 19 42	15	2 9 19 45	
	16	A		15 32	16	3 20 19 29	16	3 7 19 32	
2. ix.	17	B		15 29	17	4 18 19 15	17	4 4 19 18	
xviij. 10.	18	C		15 26	18	5 15 19 1	18	5 1 19 5	
vi.	19	D	dog. d. b.	15 23	19	6 12 18 47	19	5 59 18 51	
xiiij. 8.	20	E	Margr.	15 20	20	7 10 18 33	20	6 56 18 36	
	21	F		15 17	21	8 7 18 18	21	7 53 18 22	
iiij.	22	G	Magda.	15 13	22	9 4 18 3	22	8 51 18 7	
	23	A		15 10	23	0 2 17 48	23	9 48 17 51	
6. xj.	24	B	Fast.	15 8	24	10 59 17 32	24	10 46 17 36	
xix. 11.	25	C	S. James.	15 5	25	11 57 17 16	25	11 43 17 20	
	26	D	Anna.	15 3	26	12 54 17 0	26	12 40 17 4	
	27	E		15 0	27	13 52 16 43	27	13 38 16 47	
9. viij.	28	F		14 57	28	14 49 16 27	28	14 35 16 31	
xvj.	29	G		14 55	29	15 47 16 10	29	15 33 16 14	
v. 7.	30	B		14 52	30	16 44 15 52	30	16 31 15 57	
	31	A		14 50	31	17 42 15 35	31	17 28 15 39	

North Declination.

July.

of the Sunne.

in the third year.

in a Leap year.

	D.	M.	D.	M.
1	18	34	22	14
2	19	32	22	6
3	20	29	22	57
4	21	26	21	49
5	22	23	21	40
6	23	20	21	30
7	24	17	21	20
8	25	15	21	10
9	26	13	20	59
10	27	9	20	48
11	28	6	20	37
12	29	4	20	25
13	30	1	20	13
14	0	55	20	2
15	1	53	19	49
16	2	50	19	36
17	3	47	19	22
18	4	45	19	9
19	5	42	18	55
20	6	39	18	41
21	7	37	18	26
22	8	34	18	11
23	9	32	17	57
24	10	30	17	40
25	11	27	17	24
26	12	24	17	9
27	13	22	16	52
28	14	19	16	36
29	15	17	16	19
30	16	14	16	2
31	17	12	15	44

North Declination.

	D.	M.	D.	M.
1	19	17	22	8
2	20	15	22	0
3	21	12	21	51
4	22	9	21	42
5	23	7	21	32
6	24	4	21	22
7	25	0	21	12
8	25	58	21	2
9	26	55	20	51
10	27	53	20	40
11	28	50	20	28
12	29	47	20	16
13	30	44	20	4
14	1	42	19	51
15	2	39	19	38
16	3	36	19	25
17	4	33	19	12
18	5	31	18	58
19	6	28	18	43
20	7	26	18	29
21	8	23	18	14
22	9	20	17	59
23	10	18	17	43
24	11	15	17	28
25	12	13	17	12
26	13	10	16	56
27	14	8	16	39
28	15	5	16	22
29	16	3	16	5
30	17	0	15	48
31	17	58	15	30

27

Pegasus Shoulder of the 2. bignes, declination 12. degr. 58. min. North, right ascension 22. houres 46. minutes.

28

Pegasus Leg, of the third bignes, declination 25. degr. 58. minutes North, right ascension 22. houres 44. minutes.

29

Swans tayle, is a starre of the second bignes, whole declination is 43. degr. 54. min. North, right ascension 20. houres 30. minutes.

30

The Waggoners right shoulder is a starre of the second bignes, declination 44. degrees 49. minutes North, and right ascension 5. houres 30. minutes.

31

Hircus the Goate of the first bignes, declination 45. degrees 30. minutes, right ascension 4. houres, 49. minutes.

32

Lira of the first bignes, North declination 38. degrees 30. minutes, right ascension 18. houres 20. minutes.

August.

August hath 31. dayes.

The Prime.			Leng. of the day. H.M.	True place and Declination			
				in the First year.		in the Secd year.	
				D.M.	D.M.	D.M.	D.M.
6. xiiij.	1 C	Lamas.	14 46	1 18 40	15 17	1 18 26	15 21
2. ij.	2 D		14 42	2 19 37	14 59	2 19 23	15 4
	3 E		14 38	3 20 35	14 41	3 20 21	14 45
7. x.	4 F		14 34	4 21 33	14 22	4 21 19	14 27
xviiij. 9.	5 G		14 30	5 22 30	14 4	5 22 17	14 8
	6 A		14 26	6 23 28	13 45	6 23 14	13 49
vij.	7 B		14 22	7 24 26	13 25	7 24 12	13 30
xv. 7.	8 C		14 18	8 25 24	13 5	8 25 10	13 10
	9 D		14 15	9 26 21	12 47	9 26 8	12 51
5. iiij.	10 E	Lawren.	14 12	10 27 19	12 27	10 27 5	12 32
xii. 11.	11 F		14 9	11 28 17	12 7	11 28 3	12 12
	12 G		14 6	12 29 15	11 47	12 29 1	11 51
	13 A		14 3	13 30 13	11 26	13 29 56	11 31
3. j.	14 B		14 0	14 1 11	11 6	14 1 57	11 11
ix. 12.	15 C		13 56	15 2 9	10 45	15 1 55	10 51
	16 D		13 52	16 3 7	10 24	16 2 53	10 29
vi. 7. xvij.	17 E		13 50	17 4 5	10 3	17 3 51	10 8
	18 F		13 44	18 5 3	9 42	18 4 49	9 47
9. xiiij	19 G		13 40	19 6 1	9 20	19 5 47	9 25
	20 A		13 35	20 6 59	8 59	20 6 45	9 4
8. iiij.	21 B		13 30	21 7 57	8 37	21 7 43	8 42
xj. 9.	22 C		13 25	22 8 55	8 15	22 8 41	8 21
	23 D	Fast.	13 20	23 9 53	7 53	23 9 40	7 58
xix. 4.	24 E	Barthol.	13 15	24 10 51	7 31	24 10 36	7 37
	25 F	Apostle.	13 10	25 11 50	7 9	25 11 34	7 15
viiij.	26 G		13 6	26 12 48	6 47	26 12 33	6 52
xvj. 8.	27 A		13 2	27 13 46	6 24	27 13 31	6 30
	28 B		12 58	28 14 44	6 2	28 14 29	6 8
7. v.	29 C	Behead.	12 54	29 15 43	5 39	29 15 28	5 45
xiiij. 5.	30 D	of Iohn.	12 51	30 16 42	5 16	30 16 26	5 22
	31 E		12 48	31 17 40	4 53	31 17 25	4 59

North Declination.

August.
of the Sunne.

☉ in a third year.

☉ in a Leap year.

D.	M.	D.	M.		D.	M.	D.	M.
1	18	12	15	26	1	18	56	15 12
2	19	9	15	8	2	19	54	14 54
3	20	7	14	50	3	20	51	14 36
4	21	5	14	31	4	21	48	14 17
5	22	2	14	13	5	22	46	13 59
6	23	0	13	54	6	23	44	13 39
7	23	58	13	25	7	24	42	13 20
8	24	56	13	15	8	25	40	13 1
9	25	53	13	56	9	26	37	12 41
10	26	51	12	36	10	27	35	12 21
11	27	49	12	16	11	28	33	12 1
12	28	47	11	56	12	29	31	11 41
13	29	45	11	36	13	nr	29	11 20
14	nr	43	11	16	14	1	27	11 0
15	1	41	10	55	15	2	25	10 39
16	2	39	10	34	16	3	23	10 18
17	3	37	10	13	17	4	21	9 57
18	4	35	9	52	18	5	19	9 36
19	5	33	9	31	19	6	17	9 14
20	6	31	9	9	20	7	15	8 53
21	7	29	8	48	21	8	13	8 31
22	8	27	8	26	22	9	11	8 9
23	9	25	8	4	23	10	9	7 47
24	10	23	7	42	24	11	8	7 25
25	11	22	7	20	25	12	6	7 3
26	12	20	6	57	26	13	5	6 40
27	13	19	6	35	27	14	3	6 18
28	14	17	6	12	28	15	1	5 55
29	15	15	5	50	29	15	59	5 33
30	16	14	5	27	30	16	58	5 10
31	17	12	5	4	31	17	56	4 47

North Declination.

33

Perseus right side of the second bignes, declination 47. degr. South, right ascension 2. houres 56. minutes.

34

Formahand, is a starre of the first bignes, hauing South declination 33. degr. 15. minutes, and right ascension 22. houres, 40. minutes.

35

In the knee of Sagitarus, is a starre of the second bignes, hauing South declination 42. deg. and right ascension 18. houres 44. minut.

Starres neare about the North Pole, with their distance from the said Pole.

1

The Pole starre is of the third bignes, whose distance from the Pole is 2. degr. 52. min. and his right ascension is 50. minutes.

2

The foremost Guard of the 2. bignes, distant from the Pole 14. degr. 11. min. right ascension 14. hour. 54. min.

3

The hindermost Guard, of the 2. bignes, distant 16. deg. 42. min. right ascension 15. houres 26. minutes.

Septem

September hath 30. dayes.

The Prime,			Leng. of the day.	True place and Declination					
				in my first yere.			in my second yere.		
				H. M.	D. M.	D. M.	M.	D. M.	D. M.
12. ij.	1 F	Giles.	12 48	1	18	39	4	36	4 36
x. 8.	2 G		12 44	2	19	37	4	13	4 13
	3 A		12 40	3	20	36	3	50	3 50
3. xvij.	4 B		12 36	4	21	35	3	27	3 27
vij. 7.	5 C	Dog. da.	12 32	5	22	33	2	4	3 4
	6 D	end.	12 28	6	23	32	2	40	2 40
9. xv.	7 E	Nat. Eli.	12 24	7	24	31	2	17	2 17
iiij. 9.	8 F	Nat. Ma.	12 20	8	25	29	1	54	1 54
	9 G		12 16	9	26	28	1	31	1 31
xij. 2.	10 A		12 12	10	27	27	1	7	1 7
	11 B		12 8	11	28	26	0	43	0 43
i. 11.	12 C		12 4	12	29	25	0	20	0 20
	13 D		12 0	13	30	24	0	4	0 4
2. ix.	14 E	Hol. cro.	11 56	14	1	23	0	27	0 27
xvij. 8.	15 F		11 52	15	2	21	0	51	0 51
8. vj.	16 G		11 48	16	3	20	1	14	1 14
xiiij. 2.	17 A	Lamber.	11 44	17	4	19	1	38	1 38
	18 B		11 40	18	5	18	2	1	2 1
iiij. 7.	19 C		11 36	19	6	18	2	25	2 25
	20 D	Fast.	11 32	20	7	17	2	48	2 48
xj. 2.	21 E	Mathe.	11 28	21	8	16	3	11	3 11
	22 F		11 24	22	9	15	3	35	3 35
5. xix.	23 G		11 20	23	10	15	4	4	4 4
viiij. 9.	24 A		11 16	24	11	14	4	22	4 22
	25 B	Ciprian.	11 12	25	12	13	4	45	4 45
8. xvj.	26 C		11 8	26	13	13	5	8	5 8
v. 5.	27 D		11 4	27	14	12	5	32	5 32
	28 E	Fast.	11 0	28	15	12	6	0	6 0
4. xiiij.	29 F	S. Mich.	10 56	29	16	11	6	18	6 18
ij. 6.	30 G	Hierom.	10 52	30	17	11	6	41	6 41

North Declination.

South Declination.

September.
of the Sunne.

☉ in my third yeare.

☉ in my Leap yeare.

D. M. D. M.				D. M. D. M.			
1	18	11	4 41	1	18	55	4 24
2	19	9	4 19	2	19	53	4 1
3	20	8	3 55	3	20	52	3 38
4	21	6	3 32	4	21	51	3 15
5	22	5	3 9	5	22	49	2 52
6	23	3	2 46	6	23	48	2 28
7	24	2	2 23	7	24	47	2 5
8	25	1	1 59	8	25	46	1 41
9	26	0	1 36	9	26	45	1 18
10	26	58	1 13	10	27	43	0 55
11	27	57	0 49	11	28	42	0 31
12	28	56	0 26	12	29	41	0 35
13	29	55	0 2	13	30	40	0 16
14	30	54	0 22	14	1	39	0 40
15	1	53	0 45	15	2	38	1 3
16	2	52	1 9	16	3	37	1 27
17	3	51	1 32	17	4	36	1 50
18	4	50	1 56	18	5	35	2 14
19	5	49	2 19	19	6	34	2 37
20	6	48	2 43	20	7	33	3 0
21	7	47	3 6	21	8	32	3 24
22	8	47	3 30	22	9	32	3 47
23	9	46	3 53	23	10	31	4 11
24	10	45	4 16	24	11	30	4 34
25	11	45	4 40	25	12	30	4 57
26	12	44	5 3	26	13	29	5 20
27	13	43	5 26	27	14	29	5 44
28	14	43	5 49	28	15	28	6 7
29	15	42	6 12	29	16	27	6 29
30	16	42	6 35	30	17	27	6 22

North Declination.

South Declination.

4

The end of the Dragons
tayle of the third bignes, di-
stant from the Pole 18. deg.
26. min. right ascention 11.
houres 8. minutes.

5

The great Beares backe of
the second bignes, distant
from the Pole 26. degrees 5.
minutes right ascention 10.
houres 40. minutes.

6

Cepheus right shoulder of
the third bignes, distant 29.
degrees, right ascention 21.
houres 10. minutes.

7

The great Beares side, of
the second bignes, distant 31
deg. 26. min. right ascention
10. houres, 58. minutes.

8

The first in her tayle of the
second bignes, distant 31. de-
grees 49. min. right ascention
12. houres 32. minutes.

☾

October

October hath 31. dayes.

The Prime.			Leng. of the day. H.M	True place and Declination							
				☉ in = First yeare.				☉ in = second yeare			
				D.M.		D. M.		D. M.		D. M.	
	1 A		10 48	1	18	10	7 9	1	17 56	7 4	
2. x.	2 B		10 44	2	19	10	7 32	2	18 55	7 26	
xviii. 10	3 C		10 40	3	20	9	7 54	3	19 55	7 49	
8. vii.	4 D		10 36	4	21	9	8 17	4	20 55	8 12	
xv.	5 E		10 32	5	22	9	8 39	5	21 54	8 34	
	6 F	Faith.	10 28	6	23	9	9 2	6	22 54	8 56	
	7 G		10 24	7	24	8	9 24	7	23 54	9 18	
iii. 1.	8 A		10 20	8	25	8	9 46	8	24 54	9 40	
	9 B	Denis.	10 16	9	26	8	10 8	9	25 54	10 2	
4. xij.	10 C		10 12	10	27	8	10 29	10	26 53	10 24	
	11 D		10 8	11	28	8	10 51	11	27 53	10 46	
j.	12 E		10 4	12	29	8	11 12	12	28 53	11 7	
ix. 10.	13 F	Edward.	10 0	13	m	8	11 34	13	29 53	11 28	
xvii. 17.	14 G		9 56	14	1	8	11 55	14	m 53	11 49	
vj. 3.	15 A		9 52	15	2	8	12 15	15	1 53	12 11	
	16 B		9 48	16	3	8	12 36	16	2 54	12 31	
8. xiiij.	17 C	Fast.	9 44	17	4	8	12 57	17	3 54	12 52	
	18 D	S. Luke.	9 40	18	5	8	13 17	18	4 54	13 11	
iiij.	19 E		9 36	19	6	9	13 37	19	5 54	13 32	
	20 F		9 32	20	7	9	13 57	20	6 54	13 52	
6. xj.	21 G		9 28	21	8	9	14 16	21	7 55	14 12	
xix. 8.	22 A		9 24	22	9	10	14 36	22	8 55	14 31	
	23 B		9 20	23	10	10	14 55	23	9 55	14 50	
7. viij.	24 C		9 17	24	11	10	15 14	24	10 56	15 10	
xvj. 2.	25 D	Crispin.	9 14	25	12	11	15 33	25	11 56	15 28	
	26 E		9 10	26	13	11	15 51	26	12 56	15 47	
4. v.	27 F	Fast.	9 7	27	14	12	16 9	27	13 57	16 5	
	28 G	Simon	9 4	28	15	12	16 27	28	14 57	16 23	
ii. xiiij.	29 A	& Jude.	9 0	29	16	13	16 45	29	15 58	16 41	
2. ij.	30 B		8 56	30	17	13	17 2	30	16 58	16 58	
x. ii.	31 C		8 52	31	18	14	17 19	31	17 59	17 15	

South Declination.

October.
of the Sunne.

☉ in \approx third yere.

☉ in \approx Leap yere.

D. M.		D. M.		D. M.		D. M.	
1	17 41	6	58	1	18 27	7	15
2	18 41	7	21	2	19 26	7	38
3	19 41	7	44	3	20 26	8	1
4	20 40	8	6	4	21 26	8	23
5	21 40	8	28	5	22 25	8	45
6	22 40	8	51	6	23 25	9	8
7	23 39	9	13	7	24 25	9	30
8	24 39	9	35	8	25 25	9	52
9	25 39	9	57	9	26 25	10	14
10	26 39	10	19	10	27 24	10	35
11	27 39	10	41	11	28 24	10	57
12	28 39	11	2	12	29 24	11	18
13	29 39	11	23	13	m 24	11	39
14	m 39	11	44	14	1 24	12	0
15	1 39	12	5	15	2 24	12	21
16	2 39	12	26	16	3 25	12	42
17	3 39	12	47	17	4 25	13	2
18	4 39	13	6	18	5 25	13	22
19	5 39	13	27	19	6 25	13	42
20	6 40	13	47	20	7 25	14	2
21	7 40	14	7	21	8 26	14	22
22	8 40	14	26	22	9 26	14	41
23	9 41	14	46	23	10 26	15	0
24	10 41	15	5	24	11 26	15	19
25	11 41	15	24	25	12 27	15	38
26	12 42	15	42	26	13 27	15	56
27	13 42	16	0	27	14 28	16	14
28	14 43	16	19	28	15 29	16	32
29	15 43	16	36	29	16 29	16	49
30	16 44	16	54	30	17 30	17	7
31	17 44	17	11	31	18 30	17	24

South Declination.

9

At the knees of Cassiopeia, is a starre of the third bignes, distant from the Pole. 31. deg. 50. minutes, right ascension 1. houre.

10

In her lippe is a starre of the third bignes, distant 31. degr. 26. minutes, right ascension 32. minutes.

11

The backe of her chairs, of the third bignes, distant 33. degrees 2. minutes, right ascension 23. houres 48. minutes.

12

The great Beares thigh of the second bignes, distant from the Pole, 34. degrees 3. minutes, right ascension 11. houres 32. minutes.

☉ 2

Novem.

November hath 30. dayes.

The Prime			Leng. of the day H. M.	True place and Declination							
				☉ in m First yeare.				☉ in m se cōdyere.			
				D. M.		D. M.		D. M.		D. M.	
	1 D	All Sain.	8 49	1	19	14	17	36	1	18	59
5. xvij.	2 E		8 46	2	20	15	17	52	2	20	0
vij. 3.	3 F		8 43	3	21	16	18	8	3	21	1
	4 G		8 40	4	22	16	18	24	4	22	2
I I. xv.	5 A	Poud. er.	8 37	5	23	17	18	40	5	23	2
	6 B	Leonar.	8 34	6	24	18	18	55	6	24	3
5. iij.	7 C		8 31	7	25	19	19	10	7	25	4
	8 D		8 28	8	26	19	19	24	8	26	5
I I. xij.	9 E		8 25	9	27	20	19	38	9	27	5
i. 12.	10 F		8 22	10	28	21	19	52	10	28	6
	11 G	S. Mart.	8 19	11	29	22	20	5	11	29	7
2. ix.	12 A		8 16	12	7	23	20	18	12	7	8
xvij. 4.	13 B		8 13	13	1	24	20	31	13	1	9
8. vj.	14 C		8 10	14	2	25	20	43	14	2	10
xiiij 8.	15 D		8 7	15	3	26	20	55	15	3	11
	16 E		8 4	16	4	27	21	6	16	4	12
	17 F	Hugh.	8 2	17	5	28	21	17	17	5	13
5. iij.	18 G		8 0	18	6	29	21	28	18	6	14
xj. 9.	19 A		7 57	19	7	30	21	38	19	7	15
	20 B	Edmond	7 54	20	8	31	21	48	20	8	16
4. xix.	21 C		7 51	21	9	32	21	58	21	9	17
vij. 5.	22 D	Cicily.	7 49	22	10	33	22	7	22	10	18
	23 E	Clement	7 37	23	11	34	22	15	23	11	19
I I. xvi.	24 F		7 45	24	12	35	22	23	24	12	20
	25 G	Kather.	7 43	25	13	37	22	31	25	13	22
I O. v.	26 A		7 40	26	14	38	22	38	26	14	23
xiii. 8.	27 B		7 38	27	15	39	22	45	27	15	24
	28 C		7 37	28	16	40	22	51	28	16	25
ii. 12.	29 D	Fast.	7 36	29	17	41	22	57	29	17	26
2. x.	30 E	Andrew.	7 35	30	18	53	23	3	30	18	27

South Declination

Nouember.							
of the Sunne.							
in m third yere.				in m Leap yere.			
D.	M.	D.	M.	D.	M.	D.	M.
1	18	45	17	28	1	19	31
2	19	46	17	44	2	20	31
3	20	46	18	1	3	21	32
4	21	47	18	17	4	22	33
5	22	48	18	32	5	23	34
6	23	48	18	47	6	24	34
7	24	49	19	2	7	25	35
8	25	50	19	17	8	26	36
9	26	51	19	31	9	27	37
10	27	52	19	45	10	28	38
11	28	52	19	59	11	29	39
12	29	53	20	12	12	30	40
13	30	54	20	25	13	1	41
14	1	55	20	37	14	2	42
15	2	56	20	49	15	3	42
16	3	57	21	1	16	4	43
17	4	58	21	12	17	5	44
18	5	59	21	23	18	6	45
19	7	0	21	33	19	7	46
20	8	1	21	43	20	8	47
21	9	2	21	53	21	9	49
22	10	3	22	2	22	10	50
23	11	4	22	11	23	11	51
24	12	6	22	19	24	12	52
25	13	7	22	27	25	13	53
26	14	8	22	35	26	14	54
27	15	9	22	42	27	15	55
28	16	10	22	48	28	16	56
29	17	11	22	54	29	17	57
30	18	13	23	0	30	18	58

South Declination.



Certaine Starres neere
vnto the South Pole, with
their distance from the
said Pole, and right
Ascention.

I

The southermost starre in
the South triangle, is a
starre of the third bignes, di-
stant from the South Pole,
11. deg. 30. minutes, right
ascention 9. houres.

2

The Southermost of the
Crofters, is a starre of the se-
cond bignes, distant 17. de-
grees 30. minutes, right as-
cention 12. minutes.

3

In the Northwest angle of
the South triangle, is a
starre of the second bignes,
distant from the Pole, 27.
degrees 25. minutes, right
ascention 8. houres 4. mi-
nutes.

© 3

Decemr

December hath 31. dayes.

The Prime			Leng. of the day	True place and Declination			
				☉ in 1 st year.		☉ in 2 ^d year.	
				H. M.	D. M. D. M.	D. M. D. M.	
xviiij. 5	1		7 34	1	19 44 23 8	1	19 29 23 6
	2	G	7 33	2	20 45 23 12	2	20 30 23 11
9. viij.	3	A	7 32	3	21 46 23 16	3	21 31 23 15
xv. 4.	4	B	7 31	4	22 47 23 20	4	22 33 23 19
	5	C	7 30	5	23 48 23 23	5	23 34 23 22
	6	D	7 30	6	24 50 23 25	6	24 35 23 25
10. iiij.	7	E	7 30	7	25 51 23 28	7	25 36 23 27
xij. 7.	8	F	7 30	8	26 52 23 29	8	26 38 23 29
	9	G	7 30	9	27 54 23 30	9	27 39 23 30
2. i.	10	A	7 30	10	28 55 23 31	10	28 40 23 31
ix. 7.	11	B	7 30	11	29 56 23 31	11	29 42 23 31
xviij. 15.	12	C	7 30	12	30 57 23 31	12	30 43 23 31
vi. 9.	13	D	7 30	13	1 59 23 31	13	1 44 23 31
	14	E	7 31	14	3 0 23 29	14	2 45 23 30
xiiij. 3.	15	F	7 32	15	4 2 23 28	15	3 47 23 28
	16	G	7 33	16	5 3 23 26	16	4 48 23 26
iiij. 11.	17	A	7 34	17	6 4 23 23	17	5 49 23 24
	18	B	7 35	18	7 6 23 20	18	6 51 23 21
xj.	19	C	7 36	19	8 7 23 17	19	7 52 23 17
xix. 8.	20	D	7 37	20	9 8 23 13	20	8 53 23 14
	21	E	7 38	21	10 10 23 8	21	9 55 23 9
8. viij.	22	F	7 39	22	11 11 23 3	22	10 56 23 4
xvi. 3.	23	G	7 40	23	12 12 22 58	23	11 57 22 59
	24	A	7 41	24	13 14 22 52	24	12 58 22 53
v. 10.	25	B	7 42	25	14 15 22 46	25	14 0 22 47
	26	C	7 43	26	15 16 22 39	26	15 2 22 40
xiii. 3.	27	D	7 44	27	16 18 22 32	27	16 3 22 33
ii. 1.	28	E	7 46	28	17 19 22 24	28	17 4 22 26
x. 9.	29	F	7 48	29	18 20 22 16	29	18 6 22 18
	30	G	7 49	30	19 22 22 7	30	19 7 22 9
7. xviiij.	31	A	7 50	31	20 23 21 58	31	20 8 21 1

South Declination.

Deuember.

of the Sunne.

○ in 3rd year.

○ in 4th Leap yere.

D. M. D. M.					D. M. D. M.				
1	19	14	23	5	1	20	0	23	9
2	20	15	23	10	2	21	2	23	13
3	21	16	23	14	3	22	3	23	17
4	22	18	23	18	4	23	4	23	21
5	23	19	23	21	5	24	6	23	24
6	24	20	23	24	6	25	7	23	26
7	25	22	23	27	7	26	8	23	28
8	26	23	23	29	8	27	9	23	30
9	27	24	23	30	9	28	11	33	31
10	28	26	23	31	10	29	12	23	31
11	29	27	23	31	11	30	13	23	31
12	30	28	23	31	12	1	15	23	31
13	1	30	23	31	13	2	16	23	30
14	2	31	23	30	14	3	17	23	29
15	3	32	23	29	15	4	19	23	27
16	4	34	23	27	16	5	20	23	25
17	5	35	23	24	17	6	21	23	22
18	6	36	23	22	18	7	23	23	19
19	7	38	23	18	19	8	24	23	15
20	8	39	23	14	20	9	25	23	11
21	9	40	23	10	21	10	27	23	7
22	10	42	23	6	22	11	28	23	2
23	11	43	23	0	23	12	29	22	56
24	12	44	22	55	24	13	31	22	50
25	13	46	22	49	25	14	32	22	44
26	14	47	22	42	26	15	33	22	37
27	15	48	22	35	27	16	34	22	30
28	16	50	22	28	28	17	36	22	22
29	17	51	22	20	29	18	37	22	14
30	18	52	22	12	30	19	38	22	5
31	19	53	22	3	31	20	40	21	56

South Declination.

4

The forepart of the Centaur of the second bignes, distant 29. degrees 54. minutes right ascension 14. houres 44. minutes.

5

Centaur's thigh of the second bignes, distant 40. degrees 30. minutes right ascension 11. houres 52. minutes.

6

Canopus in argo nauis, of the first bignes, distant from the South Pole 38. degrees 10. minutes, right ascension 6. houres 20. minutes.

7

The last of Eridanus of the first bignes, distant 50. degrees right ascension 3. houres.

How to vse these Starres, for the time of their being vpon the Meridian, and consequently to finde the height of the Pole or Latitude by them, followes afterward.

C4

This

The Sea-mans Kalender.

	♈		♉		♊	
	D. M.		D. M.		D. M.	
0	0	0	11	30	20	12
1	0	24	11	51	20	25
2	0	48	12	12	20	37
3	1	12	12	33	20	49
4	1	35	12	53	21	0
5	2	0	13	13	21	11
6	2	23	13	33	21	22
7	2	47	13	53	21	33
8	3	11	14	13	21	42
9	3	35	14	32	21	51
10	3	58	14	51	22	0
11	4	22	15	10	22	9
12	4	45	15	28	22	17
13	5	9	15	47	22	25
14	5	32	16	5	22	32
15	5	55	16	23	22	39
16	6	19	16	40	22	46
17	6	42	16	57	22	52
18	7	5	17	14	22	57
19	7	28	17	31	23	3
20	7	50	17	47	23	7
21	8	13	18	3	23	12
22	8	35	18	19	23	15
23	8	58	18	34	23	19
24	9	20	18	49	23	22
25	9	42	19	4	23	24
26	10	4	19	18	23	26
27	10	25	19	32	23	28
28	10	47	19	46	23	29
29	11	9	19	59	23	30
30	11	30	20	12	23	30
	♈		♉		♊	
	♈		♉		♊	

This Table sheweth the Declination of the Sunne vpon euery seuerall degree of the Ecliptick through all the foure quarters of the Zodiacke: by which Table you may make tryall of the former Table of Declination, if you doubt of any part thereof, as followeth:

First by the Kalender or Ephemerides next before, finde out the day of the month, for which you desire the Declination, and right against the same you shall haue the signe, degree and minute, which the Sunne posseth in the Zodiacke the day aforesaid, with which signe and degree, enter this Table, and marke whether your signe be at the head of the Table, or at the foote thereof, for if the signe be at the head, then you must count the degree thereof downeward, in the first Column at the left hand of the Table: but if the signe be at the foot of the Table, you must count the degree thereof upward, in the first Column on the right hand: and in the common angle, where the Characters of the signe and degree thereof meetes, is the degree and minutes of Declination desired.

Example.

The 12. of Aprill 1622. the place of the Sunne is 2. degrees of Taurus. I finde Taurus in the head of the Table, therefore counting 2. degrees thereof downe.

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downeward in the first Colūme on the left hand, right against 2. in the Colūme where Taurus stands, is 12. degrees 12. minutes, which is the declination of 2. degrees of Taurus, or of the Sunne, being in so many degrees of the same signe. But if the place of the Sunne haue odde minutes therewith, you must take the difference of the two nearest degrees of Declination, and worke by the proportionall partes of 60. minutes to a Degree.

As for Example.

The 22. of August 1623. the true place of the Sunne is 8. degrees 27. minutes of Virgo, I finde Virgo to be in the scote of the Table, therefore in the first Colūme on the right hand, I count upwards 8. degrees, and right against the same in the Colūme where the Character of Virgo is, I finde 8. degrees 35. minutes, which is the Declination of 8. degrees of Virgo, but now there is the declination of 27. minutes to be either added or deducted, as the declination doth increase or decrease. To finde which, I take the difference betwixt 8. degrees 35. minutes, the declination of 8. degrees of Virgo and 8. 13. minutes, the declination of 9. degrees of Virgo, which is 22. minutes. Then I say, if 60. min. giue 22. minutes, what giues 27. min. facit 10. minutes nearest: which because the declination doth decrease, I deduct 10. minutes from 8. 35. minutes, and the remainer is 8. deg. 25. minuts, for the true Declination of 8. degrees 27. minutes of Virgo.

Againe, the 16. of Aprill, 1624. the true place of the Sunne is 6. degrees 38. minutes of Taurus, I finde Taurus in the head of the Table, then counting 6. degrees downeward in the first Colūme on the left hand, right against the same vnder Taurus, is 13. 33. min. for the Declination of 6. degrees of Taurus: then for the 38. minuts, I take the difference betwixt 13. 33. minutes and 13. 53. min. the declination of 7. deg. of Taurus: which is 20. min. then I say, if 60. giue 20. what giues 38. facit 13. minutes, nearest which 13. min. I adde to 13. 33. minutes, because the Declination doth increase and it makes 13. 46. minutes for the true Declination of 6. 38. minutes of Taurus. These three examples (to the ingenious) are as good as five hundred.

The

The diuision, partes, order, and explanation of the former Almanacke or Ephemerides.

The first Page of the said Ephemerides containes an Almanacke for 24. yeares to come, shewing the Prime, Epact, Sunday letter, Leape yeare, withall the principall moueable Feasts in the whole yeare. Next followes the 12. monthes of the yeare in order, each month containing two faces, which 2. faces may be deuided into 3. principall sections: the first common, the second and third Astronomicall: the first being indeed the common, because it is most needfull for all persons, consisteth of five Columns or spaces: the first space whereof sheweth the day and houre of the Moones change for 19. yeares to come: the second sheweth the number of the dayes in euery month: the third, the Letters ordinary for euery day of the weeke: the fourth, the Holidages, and other dayes of note in each month. Where note, that those that are obserued for holy dayes, haue this word Fast, before them, and the first or last of the said first section, sheweth the length of the day in houres and minutes, where the Pole is eleuated 51. degrees 40. minutes.

The second section containeth 4. principall parts, each part consisting of 3. Columns, the 4. partes being 4. seuerall yeares, each fourth yeare being Leape yeare, therein comprising the variety of the Sunnes course through the Zodiacke in the said 4. yeares. And the 3. spaces or Columns in each yeare, the first is the dayes of each month in the said yeare: the second the true place of the Sunne answerable thereto, the third, the Declination or distance of the Sunne from the Equinoctiall pointes of Aries and Libra, toward the tropicall points of Cancer and Capricorne, answerable to each day of the month, and to the degree and minutes of the Sunne in the Zodiacke.

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The reason wherefore the said Table is made for foure yeares and neither more nor lesse, is, because that every yeare is not of like equality of dayes one with another: for the first yeare hath 365. dayes & nere 6. houres: the second and third yeares being so likewise, but in the fourth yeare the odde houres are united together, which being 4. times 6. is 24. houres very neare, making a naturall day, which day is added to the said fourth yeare, whereby the said fourth yeare is called Leape yeare, because it hath one day more then the primary or foregoing yeares.

And so this Table being made for 4. yeares, would serue for a long time, were it not that the said fourth yeare is not iust 366. dayes, but wants 20. min. or the $\frac{1}{2}$. of an houre, or if there were a iust equality made of the dayes of the yeares, with the progresse of the Sun through the Zodiacke, then this table would serue for a long time without correction: but onely the Zodiacke, with the whole eight Sphaeres hath a certaine retrograde motion or going backward, yet so insensibly, that these Tables being gathered and calculated out of the best & truest Ephemerides for the yeares 1621. 1622. 1623. 1624. according to the true place and daily motion of the Sunne there exactly gathered, I make no question but that they will very well serue for 20. yeares at the least, the difference of the Sunnes place every 5. yeare is so small, being not much aboue 30 seconds or halfe a minute, which in 20. yeares being 5. Bisextels or Leape yeares, makes 2. minutes 30. seconds: a small matter to make any difference in the Sunnes declination.

Notwithstanding which small error that can growe in so long a time, I thinke it not amisse for the satisfying of those ingenious spirits, which desire perfection in their worke, to adde this one rule for their further satisfaction, that after these foure yeares are past, for which the said former Tables are exactly and truly calculated, to know precisely the true place of the Sunne, for any other 4. yeares afterward, doe thus: substract 1620. from the date of the yeare in which you would know the true place of the Sun, the remainder whereof deuided by 4. that which remaines vpon the said diuision, shewes which of the 4. yeares in the former Kalender serueth to shewe the Sunnes place for the
yeare

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yeare proposed, and if nothing remaine after the Division, then the last of the yeares being the fourth in number, is your yeare desired: which knowne, to make an equation of the Sunnes true place, marke how many Unities are in your quotient, for so many minutes must be added to the Sunnes place in the said yeare formerly found for every day in the monthes of May, June, July, August, September and October, and halfe of so many minutes in the other monthes.

As for Example.

I would knowe the true place of the Sunne the 15. of August, in the yeare 1626. first I substract 1620. from 1626. and there rests 6. which divided by 4. brings 1. in the quotient, and 2. remaines, which 2. shewes that the second of the 4 yeares, answeres to the yeare desired, and being that there is 1. in the quotient, therefore I must adde 1. minute to the place of the Sunne which is belonging to the day and yeare aforesaid, which being that to the 15. of August in the second of the yeares, belongs 1. degree 55. minutes of Virgo, I adde 1. minute thereto, and the whole 1. degree 56. minutes is the true place of the Sunne for the day and yeare aforesaid, whose Declination answerable thereto, you shall finde right against the same in the next Columne towards the right hand to be 10. deg. 51. minutes.

Againe, the 15. of March in the yeare 1625. I desire the true place of the Sun, therefore substracting 1620. from 1625. rests 5. which divided by 4. the quotient is 1. and the remainder is 1. which remainder being 1. I must seeke for the Sunnes place in the first of the 4. yeares, whose place there I finde for the 15. of March to be 5. degrees 6. minutes of Aries: to which, because the quotient is 1. I adde halfe thereof, which being 30'. makes 5. deg. 6. min. and 30'. for the Sunnes true place the 15. of March 1625. whose declination answerable thereto, you shall finde right against the same in the next Columne towards the right hand, to be 2. degrees 2. minutes Northerly:

Wherein thus much is to be noted, that albeif, that in the true place of the Sunne there may be in that time so much difference, yet

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yet in the Declination thereof there can be no sensible difference, for we see, that 3. minutes more or lesse in the true place of the Sunne doth not produce aboue a minute difference of Declination, when the Sunnes Declination is swiftest, which is neare vnto the Equinodiall point, and being neere vnto the Tropickes, when the Declination doth increase or decrease very slowly three or foure minutes difference in the Sunnes true place, doth not make any difference in the Declination at all: And therefore by that reason you may be well assured, that these Tables being exactly calculated for the yeares aforesaid, will serue you for a very long time without any sensible error.

The third section being the last of the second face, containeth the names, magnitudes, and Declinations of 54. notable fixed Starres, with their right ascention in houres and minutes, most commodious to finde the eleuation of the Pole, whose use followeth afterward.

Propositions to bee wrought by the Ephemerides or Sea-mans Kalender, as followeth.

To knowe the Moones Change.

I

TO knowe the day and houre of Coniunction or Change of the Moone, first looke in the first page of this Ephemerides, right against the yeare of our Lord, for the Prime number, seruing to that yeare: which number keeping in memory, turne to the month in which you desire the Change of the Moone, and in the first Column of the said month vnder the title Prime, looke for the Prime number which you kept in memory, which Prime numbers are there all in numerall Letters, and right against the said Prime number in the next Column, is the number of the day of the Month on which the Moone changes: and if there be any figure
with

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With the Prime number, make whether it be before or after the said Prime number, for if it be before, it sheweth the Moone to change so many houres before none: if after, it sheweth so many houres after none: but if there be no figures at all with the Prime number, then the Moone changes just at none.

As for Example.

In the yeare 1623. I would know in June upon what day and houre of the said month the Moone changes: in the first Page being an Almanacke of 24. yeares: for the Prime, Epact, Dominicall Letter, and moueable Feasts, I finde the Prime for that yeare to be 9. which keeping in memory I turne to June, and in the first Coloume thereof vnder the title Prime, among the numerall Letters I seeke for ix. which I finde right against the 17. day of the month, thus ix. with the figure of 9. after it, which sheweth that in June 1623. the Moone changes the 17. day, 9. houres after none, which is at 9. a clocke in the evening.

Again, in September the same yeare, the Prime ix. vnder the title Prime in the month of September, I finde the Prime also, said right against the 14. day of the month, with the figure 2. before it, and further against it in the third Coloume, among the Letters for the dayes of the weeke, is the letter E. which by reason that E. is the Dominicall or Sunday letter for that yeare, E. stands for Sunday: so that I conclude, that in September 1623. the Moone shall change the 14. day being Sunday 9. houres before none.

Of the full and quarters of the Moone.

2

The next thing to be considered herein, is the first quarter, the full Moone, and the last quarter thereof, which is thus done: to the time of her Change add 7. dayes and 6. houres, sheweth the first quarter, that doubled shewes the opposition or full: and thereto againe the said 7. dayes, 6. houres added, makes the time of the last quarter.

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To know what Signe the Moone is in.

3.

A third thing needfull to be knowne, is in what signe the Moone is at all times, which may thus be done: vpon the change day next before your day required, looke in the second section of the Ephemerides vnder the yeare desired, and the Colume of the place of the Sunne for the day and yeare, what signe and degree thereof the Sunne was in vpon the said day of the Coniunction, for then were the Sunne and Moone both in one signe and degree: and to know what signe she is in any day after, multiply her age by 12. which is the meane motion of the Moone: and from the day of the coniunction, in the Colume of the true place of the Sunne, tell forward, if the number be so great, out of that month to the next, till you haue tolde the number of the product of the Moones age, multiplied by 12. and where the said product number ends, is the signe and degree of the Moone.

Example.

The 16. of October 1623. I desire the same: in which month by the first proposition, I finde the Moone to change the 13. day at 10. a clocke after noone: vnder the title third yeare, shewing the true place and declination of the Sunne for the said yeare: in the first Colume thereof I seeke the said 13. day of the month, and right against it in the next Colume is 29. degrees 39. minutes of Libra, in which signe and degree both the Sunne and the Moone were at the coniunction: then counting from the change to the 16. day is 3. dayes for the Moones age, that multiply by 12. is 36. which counting from the day of the Coniunction along in the Colume of the Sunnes place, ends vpon the 18. day of the month of Nouember, against which day is 5. degrees 49. minutes of 7: therefore I conclude the Moone to be in Sagitarius the day, month and yeare aforesaid: otherwise if you multiply the Moones age by 2. and deuide the product by 5. the quotient shewes the whole signe, and the remainder so many times 6. degrees, as the Moone is gone from that place of the Zodiacke where she was in the Coniunction.

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The Moones comming to the Meridian, with the time of her rising and setting.

Multiply the Moones age by 12. and deuide the Product by 15. the quotient sheweth the houre of the Moones being South, and if any thing remaine after the diuision, for every vnit that remaines adde 4. minutes, because 15. degrees makes an houre of time, and 4. minutes a degree. What knowne, learne by the third Proposition what signe the Moone is in, and then looke out in the second section what time and day of the yeare the Sunne posseseth the same signe and Degree thereof, and right against the said day in the last Columbe of the first section, vnder the title length of the day, is the length of the day, the Sunne being in the same signe in houres and minutes: halfe that number of the dayes length taken from the time of the Moones being South, sheweth her rising, and the said halfe added to the time of her being South, sheweth her setting.

Example.

The 16. of October 1623. by the first Proposition, I finde the Moone to change that month, the 13. day after none, and the number of dayes betwixt that and the 16. aforesaid is 3. for the Moones age, therefore multiplying (her age) by 12. her meane motion, the product is 36. which deuided by 15. (the degrees answering to an houre) the quotient is 2. houres, and 6. remaines, which is so many times 4. minutes: so I conclude the Moone to be vpon the Meridian the day aforesaid, at 2. of the clocke and 24. minutes. When by the third proposition, I finde the Moone to be that day in about 6. degrees of Sagitarius, the Sun being in which place, is aboue the Horizon 8. houres: which is likewise the time of the Moones continuance aboue the Horizon at that time, or at any time being of like age, and in the same signe: therefore taking halfe 8. houres which is 4. houres, from 8. a clocke, the time of the Moones being South, there rests 4. houres for the time of her rising. Likewise adding foure houres to eight houres maketh

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maketh at 12. after noone, for the time of her setting. Thus you see that the day and yeare aforesaid, the Moone shall here in our Horizon, rise at 4. a clocke after noone: she shall be South, or upon the Meridian, at 8. a clocke after noone: she shall set at 12. a clocke at night: and her continuance about the Horizon, or her shining to vs, is 8. houres.

This is a very necessary thing to be knowne, for by her being vpon any other point of the Compasse, you may giue a very neare guesse, at euery houre of the night.

The next thing to be considered in the first section, is the fea-
stiuall dayes, and other dayes of note, which are so common, that they neede no explanation. Onely this: befoze euery feast which is kept Holiday, is set this word Fast.

To know the length of the Day; or the length of
the Night, with the rising and setting
of the Sunne.

5.

All this is performed by the last Colu[m]ne of the first section, thus: Right against the day of the month desired in the last Colu[m]ne of the said first section, vnder the Title Length of the day, is the length of the day desired, in houres and minutes: which number subtracted from 24. the length of the naturall Day, leaues the length of the Night: and halfe the said number taken from noone, leaues the houre of the Sunnes rising: the other halfe of the day added to noone, sheweth the Sunnes setting.

Example.

The 19. of October in the yeare 1627. vnder the Title Length of the day, right against the said 19. day, is 9. houres 36. minutes, the length of the day: which 9. hou. 36. min. taken from 24. houres, leaues 14. hou. 24. minutes for the length of the night. Then the halfe of 9. houres 36. minutes, which is 4. houres 48. minutes taken from noone, leaues 7. houres 12. min. for the Sun rising. The saue 4. houres 48. minutes added to noone, makes 16. houres 48. minutes, which is 4. houres 48. min. after noone:

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By which you see that the 19. of October, the length of the day, is 9. houres 36. min. the length of the night 14. houres 24 minutes: the Sunne riseth 12. minutes after 7. in the morning, and setteth 48. min. after 4. in the evening.

Thus much for the first section: the second section being foure parts, serving for foure severall yeares, every part having three Columns: the first the day of the month, the second the true place of the Sunne, and the third the Declination of the Sun agreeing thereto, all the three parts being of like quality, which are so plaine and commonly knowne, that they neede no further distinction, albeit that the uses thereof are manifold, and commodities excellent: For there are few propositions concerning the Spheare, which can be wrought without the true place of the Sunne knowne, and being so much use for it, there are few meanes for the true knowledge thereof, but onely by the Ephemerides, which every one cannot have.

And for that cause I have transferred the true place of the Sun in degrees and minutes, out of the best Ephemerides into this former Kalender, where it is ready for such as desire the same, or as have occasion to use the same, in working conclusions, or making of Instruments Mathematicall: but most chiefly I have here placed it, to the end that those that stand in doubt of the truth of these Tables of the Sunnes Declination, may at their owne pleasure make tryall thereof: The order how to doe the same, is set downe in the first printed page, after the said Tables: for by the true place of the Sunne, is found his Declination, either North or South: and by his Declination, and observation of the Sunnes Altitude upon the Meridian, is knowne the height of the Pole or Latitude of the place where you are.

How to use the Sunnes Declination, thereby to finde out
the Eleuation of the Pole.

6

To finde out the Altitude or height of the Poles, in any severall Latitude, viz. How much the Pole is raised above your Horizon in degrees and minutes, It is necessary first to take by
observation

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obseruation, the Meridian Altitude of the Sunne: which Meridian Altitude is knowne, by taking the height of the Sunne, that day, in which you would obserue, iust at none: at which time the Sunne is highest, being then also vpon the Meridian: which found, note it downe in paper or slate: Then knowing the yeare of our Lord, with the month in which you are, and also the day of the month, looke in the Kalender befoze spoken of, for the month and day thereof, and right against the said day of the month toward the right hand, vnder the Title Declination of the Sunne, you shall see the seuerall yeares, which the said Tables of Declination serue for. If it be the Leape yeare, looke in the last of the said foure Tables, vnder the Title Leape yeare: If it bee the first yeare after the Leape yeare, then resort to the first of the said Tables vnder the Title First: and so of the Second and Third, and after those foure yeares are past, come backe againe to the first, and proceed as you did befoze: then (as I said) having found out the month, day, and yeare, direct your eye downeward toward the foote of the Table, in that Table which serues to the yeare proposed, till you find a number making a right angle, with the day of your month: or more plainely, Looke what number in the last Columne of your yeare, is right against the day of your month: which numbers are the Declination for the day desired: and being two numbers in the said Columne, the first are Degrees, the other Minutes: then regard also, whether the Sunne hath North Declination or South Declination, which is set downe betweene the seuerall spaces: where by the way you shall note, that from the Suns entrance into Aries, which is the 11. of March, till his entrance into Libra, the 13. of September, he hath North Declination: and from the said 13. of September till his entrance into Aries againe, South Declination: the said Declination increasing according to the Sunnes progresse through the signes, from his entrance into Aries, till his entrance into Cancer: and decreasing from Cancer to the beginning of Libra. Then againe increasing from Libra to Capricorne, and decreasing from Capricorne to the end of Pisces, and beginning of Aries. Aries, Taurus, Gemini, Cancer, Leo, and Virgo, being Signes hauing North Declination

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netion from the Equinoctiall Circle : and Libra, Scorpio, Sagittarius, Capricornus, Aquarius, and Pisces, South Signes, hauing South Declination from the said Circle : then knowing (as I haue said) the Meridian Altitude of the Sunne, the Declination of the Sun, and whether the Sunne hath South or North Declination, as these three things are alwayes to be considered, in knowing the height of the Pole. If the Declination be North, subtract the Declination from the Meridian Altitude, the remainder is the eleuation of the interfection, or cutting of the Equinoctiall with the Meridian about the Horizon, which in common tearmes is the eleuation of the Equinoctiall about the Horizon : which height of the Equinoctiall, taken from 90. leaueth the height of the Pole, or the Latitude of the place of your obseruation. But contrariwise if the Sunne hath South Declination, adde the said Declination to the meridian Altitude, the product is the height of the Equinoctiall, which likewise taken from 90. leaueth also the height of the Pole.

Example.

I obserued the 11. of July, 1624. in the Citty of London, and found the Meridian Altitude of the Sunne to be 58. degrees 56. minutes, and the Declination of the Sunne North 20. degrees 28. minutes : Being that the Declination was North, I subtracted 20. deg. 28. minutes, the Declination of the Sunne from 58. degrees 56. minutes, the height of the Sunne at noone : the remainder was 38. deg. 28. min. the height of the Equinoctiall : that taken from 90 leaues 51. degrees 32. minutes for the height of the Pole, or Latitude of London.

This rule is to be vnderstood, when you are betwene the Equinoctiall and the North Pole, and the Sunne to the southward of you : But if you should be betwene the Equinoctiall and the South Pole, and the Sun North from you, then you must worke contrary : for then if the Sunne hath South Declination, you must subtract the Declination from the Meridian Altitude, and if the Sunne hath North Declination, you must adde the said Declination to the Meridian Altitude.

For

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For Example.

Being at Sea to the Southwards of the Line, the 4. of January, 1624. suppose that you obserue the height of the Sunne at none, and finde it to be 66. degrees 20. minutes, then you shall finde the Declination to be 21. degrees 24. minutes, to the Southwards, which subtracted from 66. degrees 20. minutes, the Meridian Altitude, leaues 44. degrees 56. minutes for the height of the Equinoctiall: that taken from 90. rests 45. degr. 4. minutes, for the height of the South Pole aboue the Horizon.

Againe, suppose that being at sea, the 10. of May, 1624. and obseruing the Sunne, you take his Altitude at none 60. degrees 30. minutes, and his Declination then is 20. degr. 10. min. Northward, but then not hauing obserued long before, you know not whether you are to the Northward of the Equinoctiall, or to the southward of the said Line: to know which, set the Sun by your Compass, and make which way the shadow of the Sunn stræketh: for if he casteth his shadow the same way that his Declination is, then is the Sun betwixt the Equinoctiall and you. Your selfe being also the same way that the Sunnes Declination is: and therefore subtracting the Declination 20. degrees 10. minutes, from 60. degrees 30. minutes the Meridian Altitude: rests 40. degrees 20. min. the height of the Equinoctiall: the complement whereof 49. degr. 40. minutes is the eleuation of the North Pole: but if the Sunne casts his shadow contrary to his Declination, that is to say: If hauing North Declination, his shadow goeth southward, or hauing south declination, casts his shadow Northward: Then either the Equinoctiall shall be betwixt you and the Sun, or you in the Equinoctiall: or else you shall be betwixt the Equinoctiall and the Sunne: which to know, adde the Declination and the Meridian Altitude for the day proposed together, If the summe of the addition be lesse then 90. degrees, so much as it wanteth of 90. degr. shall you be distant from the Equinoctiall, that way which the shadow stræketh: If it be iust 90. degr. then are you vnder the Equinoctiall. Againe, if your said Meridian Altitude and Declination added, passeth 90. degr. then so much as is ouer-plus, shall you be from the Equinoctiall towards the

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Sunne, and then also you shall be betwixt the Equinoctiall and the Sunne, and if you finde the Sunne to be in your Zenith, so much as is the Declination shall you be from the Equinoctiall, that way that the Sunne declineth: By which reason, if the Sun be in your Zenith, that is 90. degrees high, and hath no Declination, then are you vnder the Equinoctiall.

How to appropriate the Tables of Declination to any other Meridian.

There is in the vsing of the Sunnes declination, one principall thing to be considered: which is, That a Table of Declination made for any particular place, doth not serue generally for all places, but onely for such places as haue the like, or nere the same Longitude: The reason is, because that the Declination is calculated according to the true place of the Sunne at noone, at which time the Sunne is vpon the Meridian of that place for which the said Tables are made: But you must note that the Sunne both not come to the Meridian in all places at a like time, although that in all places the Sunne being vpon the Meridian, makes the middle of the day. But for euery 15. degrees difference of Longitude betweene any two places, the Sunne comes sooner or later to the Meridian, by so many houres: For if the place be 15. degrees to the Eastward of the place prefixed, then the Sunne comes sooner to the Meridian by an houre, and if it be 15. deg. to the Westward, later by an houre. And so consequently more or lesse, according to the difference of Longitude. By which reason, in what part of the world soeuer you be, you may worke for the Declination of the Sunne in that place, by the proportionall parts of 24. houres Declination, to the houre of difference in Longitude.

As for Example.

Being in Brasilia, (a part of the West Indies) the 10. of Aprill, this yeare 1624. whose Meridian is distant from the Meridian of England, to the Westward about 45. deg. which is 3. hou. of time, that the Sunne should come to the Meridian later there then here at London where the Table is made: For when it is 12. a clocke here, it is but 9. there, and being noone there, it is 3. a clocke here.

Therefore

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Wherefore to apply this Table to that place, I finde the Declination for the day aforesaid, vnder our Meridian to be 11. degr. 43. min. at none, and by reason that when it is 12. a clocke at Brasilia, it is then at London 3. houres past. Therefore by the rule of proportion, I seeke what declination the Sun hath at 3. a clock after none, as followeth. I take the difference of Declination between the day aforesaid, and the next following, which is 20. min. then I say by the rule of 3. if 24. houres giue 20. minutes, what giues 3. houres, the time of the difference of Longitude? facit 2. min. and 30. seconds, which (because the Declination increases) I adde to the number of the day proposed: so I conclude the declination of the Sunne to be the 10. of Aprill at none, in the Kingdome of Brasilia, 11. degrees 45. minutes and $\frac{1}{2}$.

Againe, the day and time aforesaid, in the Bay of St. Sebastian, whose Longitude is 58. degrees to the Eastward of London, answering neere to 4. houres of time, shewing that the Sun comes sooner to the Meridian in the Bay of St. Sebastian, by 4. houres then at London: by which reason the Declination is lesse there, then at London, because the Declination doth increase: For if the Declination did decrease, it would be more there then at London: and to know the declination of the Sunne in the Bay aforesaid: I take the difference betwixt the Declination of the 10. of Aprill, and the Declination of the day next before, being 20. min. Then (I say) if 24. houres giues 20. min. what 4. houres? facit 3. min. which deducted from 11. degr. 43. minutes, the declination of the Sun the 10. of Aprill aforesaid at London, leaueth 11. degr. 40. minutes: The declination of the Sunne at none, in the Bay of St. Sebastian, being that when it is 12. of the clocke there, it is but 8. a clocke at London: or in any place hauing the same Longitude.

How to obserue the height of the Pole by
the Starres.

The working hereof by the starres, to finde the height of the Pole, is all alike with the working thereof by the Sunne: for if you obserue any starre vpon the Meridian, looke in the third

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02 last section of the Ephemerides, amongst the monthes for the name of the Starre which you obserued, wherewith you shall finde his Declination either North 02 South, and the right ascension thereof in houres and minutes: and hauing taken the Altitude of any starre vpon the Meridian, you haue nothing to mark in the Table for this but the Declination, which if it be North, take the Declination of the Starre from the height thereof: The remainder taken from 90. leaueth the height of the Pole: but if the starre hath South declination, adde the declination with the Altitude taken, and the Product thereof taken from 90. leaues the height of the Pole: Also to finde the time of any starres comming to the Meridian, is set downe after the Table of the Sunnes right ascension.

Example.

The 25. of Nouember 1624. I obserued a Starre of the second bignesse in the shoulder of Pegasus, 02 the Flying-horse, about 8. of the clocke in the Euening, and found the Meridian Altitude thereof to be 51, degrees 26. minutes: and in the Kalender, in the second face thereof, I finde the said Starre to haue 12. degrees, 58. min. North declination: which taken from 51. degree 26. min. the height obserued leaues 38. degr. 28. minutes the height of the Equinoctiall: the complement whereof 51. degr, 32. minutes, is the height of the North Pole at London.

And so consequently for all those Starres, whose Declination is taken from the Equinoctiall: but for those starres which are any thing neare to the Pole, whose distance 02 Declination is counted from the Pole, their working is thus: You must note, that being any thing farre to the Northward, some of those starres will be twice vpon the Meridian, viz. once aboue the Pole, and once vnder the Pole: Therefore if you obserue any starre vpon the Meridian vnder the Pole, adde the distance of the said starre from the Pole to your Altitude obserued, the totall is the height of the Pole: But if you obserue any starre vpon the Meridian aboue the Pole, so much as is the distance 02 Declination of the said starre from the Pole, you must take from the Altitude taken, the remainder is the height of the Pole.

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As for Example.

If at London you obserue the former Guard Starre beneath the Pole vpon the Meridian, you shall finde it to be 37. degrees 21. minutes, to which if you adde 14. degrees 11. minutes, the distance of the said Starre from the Pole, the totall is 51. degrees 32. minutes, the height of the North Pole at London. Again, the same Starre obserued vpon the Meridian aboue the Pole is 65. degrees 43. minutes, from which 14. degrees 11. minutes, the distance alsoe said taken, leaueth 51. degrees 32. minutes as befoze.

Note that being farre Northward, those starres betwene the Equinoctiall and the Tropicke of Cancer, are best to obserue, and being betwene the said Tropicke and the Equinoctiall, those Starres about the Pole are fittest for obseruation, and for those that trauaile farre beyond the line to the Southwards: the like order must be kept by the Starres, betwene the Equinoctiall and the Tropicke of Capricornus, and those that are neare the South Pole.

And whereas the North-Starre it selfe being very neare vnto the Pole, is the fittest Starre for to be obserued, by reason of the nearenesse thereto, I haue for your further ease, made an exact Table for the declination of the North starre from the Diameter of the Poles Circle, described by the North starre, which may be also, or rather called the Elevation or depression vpon euery point of the Compasse, being very commodious, by reason whereas the other Starres are onely to be obserued vpon the Meridian. This said North starre by the helpe of this Table following, may be obserued at any time of the night, whose vse followeth after the said Table.

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Pointes of the Com- passe.			Degrees	Minutes	Of Declination.
If the guards be	N.W.b.W.	Then the Load star is	0	0	Vnder the Pole.
	North west.		0	34	
	N.W. by N.		1	6	
	N.N.W.		1	36	
	N. by W.		2	4	
	North.		2	24	
	N. by E.		2	40	
	N.N.E.		2	50	
	N.E. by N.		2	52	
	North East.		2	50	
	N.E. by E.		2	40	
	E.N.E.		2	24	
	E. by N.		2	4	
	East.		1	37	
	E. by S.		1	6	
If the guards be	E.S.E.	Then the Load star is	0	34	Aboue the Pole.
	S.E. by E.		0	0	
	South East.		0	34	
	S.E. by S.		1	6	
	S.S.E.		1	36	
	S. by E.		2	4	
	South.		2	24	
	S. by W.		2	40	
	S.S.W.		2	50	
	S.W. by S.		2	52	
	South west.		2	50	
	S.W. by W.		2	40	
	W.S.W.		2	24	
	W. by S.		2	4	
	West.		1	36	
	W. by N.		1	6	
	W.N.W.		0	34	

This former Table sheweth how much the North starre is, either aboue or beneath the Pole, the Guards being vpon any point of the Compasse.

The vse of which table is thus: hauing obserued the Altitude of the North starre, marke so neere as you may, vpon what point of the Compasse the Guards then are: which known, resort to this Table, and finding therein the said point vpon which the guards were at your obseruation, right against the same is the number of degrees and minutes, which the starre is either aboue or beneath the Pole, which number so found, if it be aboue the Pole, must be subtracted from your Altitude taken, and if vnder the Pole, it must be added to the said Altitude taken: which totall added, or remainder subtracted, is the true height of the Pole it self.

As

The Sea-mans Kalender.

As for Example,

Observing the North starre to be 58. degrees 30. min. when the Guards are at the Northeast, I looke in the Table for the Northeast point of the Compasse, and right against the same I finde 2. degrees 50. minutes under the Pole, which being that the North starre is under the Pole, I adde his Declination 2. degrees 50. minutes, to 58. degr. 30. minutes his Altitude observed, and the totall 61. degrees 20. minutes, is the iust height of the Pole it selfe in that place.

Againe, observing the North starre to be 50. degrees 15. min. above the Horizon, when the Guards are upon the Southeast point of the Compasse; I looke for Southeast in the Table, and right against the same is 34. minutes above the Pole, which being that the starre is then so much higher then the Pole it selfe, I subtract 34. minutes, the Declination of the starre from 50. deg. 15. minutes the Altitude taken, and the remainder 49. degrees 41. min. is the perfit height of the Pole above the Horizon in the said place of observation.

And now having made plaine unto you, the vse and profite of the said Table; it being indeed so necessary and commodious for the Mariners vse, as any rule whatsoeuer, it resteth now to speake somewhat more particularly of the other fixed starres, set downe in the former Kalender, or Ephemerides, whose vse is manifold and very excellent, but their vse for the finding of the Poles elevation by their Declination, observed at their being upon the Meridian, being formerly shewed, it is onely requisite to explaine unto you a brieve and easie methode for the exact and ready finding of the true time of any of the said fixed Starres coming to the Meridian, at which time they are onely fit for to be observed: for the knowledg whereof, I have here placed a Table of the right ascension of the Sunne for every day of each month throughout the whole yeare, according to his true place for every of the said dayes, formerly set downe in the Kalender or Ephemerides: the vse whereof followeth after the said Table.

A Table

A Table of the Sunnes

Days	Ianua.	Febr.	March.	Aprill.	May.	Iune.
	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
1	19 30	21 39	23 25	1 16	3 11	5 15
2	34	43	28	20	15	19
3	39	47	32	25	19	23
4	43	50	36	29	23	27
5	47	54	40	33	27	31
6	52	58	44	36	30	36
7	56	22 2	47	40	34	40
8	20 0	6	51	43	38	45
9	4	9	55	47	42	49
10	8	14	58	51	46	53
11	13	18	0 2	55	50	57
12	17	21	6	58	54	6 1
13	22	25	9	2 2	58	5
14	26	29	12	6	4 2	9
15	30	32	16	10	7	13
16	34	36	20	14	11	18
17	38	40	23	18	15	22
18	42	44	27	22	19	26
19	46	48	31	26	23	30
20	50	52	35	30	27	34
21	54	56	38	33	31	38
22	58	59	42	37	35	42
23	21 3	23 3	46	41	39	46
24	7	7	49	44	43	51
25	11	10	53	48	47	55
26	15	14	57	52	51	59
27	19	18	1 0	56	56	7 3
28	23	22	3	3 0	5 0	7
29	27		7	4	3	11
30	31		11	7	4	15
31	35		15		11	

right ascension in Houres and Minutes.

Days	July.	Augu.	Septē.	Octo.	Nouē.	Decē.
	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
1	7 19	9 22	11 16	13 5	15 5	17 12
2	23	26	20	8	9	17
3	27	30	23	12	13	21
4	31	33	27	16	17	25
5	35	36	30	19	21	30
6	40	40	33	23	25	34
7	44	44	37	27	29	39
8	48	48	41	31	33	43
9	52	52	44	34	37	47
10	56	56	48	38	42	52
11	8 0	59	52	42	46	56
12	4	10 3	55	45	50	18 0
13	8	7	59	49	54	5
14	12	11	12 3	53	48	10
15	16	15	7	57	16 3	14
16	20	18	11	14 1	7	18
17	24	22	14	5	11	23
18	28	26	18	9	16	27
19	31	29	22	13	20	32
20	35	33	25	17	24	36
21	39	36	29	20	28	41
22	43	40	32	24	33	45
23	47	44	36	28	37	50
24	51	47	40	32	41	55
25	55	51	43	36	46	59
26	59	54	47	40	50	19 3
27	9 3	59	51	44	55	7
28	7	11 2	54	48	59	12
29	11	6	58	53	17 3	16
30	15	9	13 2	57	8	21
31	19	13		15 1		25



A Declaration of the former
Table.

THinke it not amisse, before I shew the vse of the former Table of right ascension, for the finding of the time of any Starres comming to the Meridian, to explaine vnto you what we call right Ascension. Know therefore, that in the Spheare there is right ascension, oblique ascension, and meane ascension, which haue all severall definitions: but the rest being impertinent, I will onely speake of right ascension, which is thus defined: Right ascension is that portion of the Equinoctiall which commeth to the Meridian, or Pointe set with any Starre, or any part of the Eclipticke: or more plainerly, it is that number of degrees of the Equinoctiall, comprised betwixt the Eternall Equinoctiall point, or intersection of the said Equinoctiall Circle, and the first minute of Aries, and that Starre or part of the Eclipticke, which is vpon the Meridian at the day, or time desired. As for your better vnderstanding, if the beginning of Aries be vpon the Meridian, or any point or Starre in the said beginning of Aries, then hath the said point or Starre so scituated, no right ascension at all, by reason that the beginning of the Equinoctiall commeth to the Meridian therewith: But if the beginning of Cancer, or any Starre in that scituation, be vpon the Meridian, then is there with it vnder the same Meridian 90. degrees of the Equinoctiall, or 6. houres of time, being that every 15. degrees of the Equinoctiall answers to one houre of time, shewing that that Starre or point, which is in the beginning of Aries, shall come to the Meridian 6. houres sooner then

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then that other which is in the beginning of Cancer, and so of others: I doubt not but that these few words will suffice to give you the better light to that which followes. First therefore to finde the right ascension of the Sunne at any time, looke for the Month in the head of the Table, and for the day of the month at the les side of that face, where the month desired is, and in the common Angle answering to them both; is the houre and minute of the Sunnes right ascension.

As for Example.

I desire the right ascension of the Sun the 25. of May: first in the head of the Table I looke for May, which found in the first Column on the left hand, I looke for 25. and right against the same in the common Angle, under the title May, I finde 4. houres and 47. min. for the right ascension of the Sun, the said 25. of May.

These things thus knowne and considered, it is to be noted, that whereas the Sunne hath a different number for his right ascension euery day, and the Starres keepe euery one still alike number for his peculiar right ascension, the reason thereof is this:

The Starres are all fixed in the eight Spheare, in which eight Spheare, is also the Zodiack placed, not onely to limit the course and progresse of the Sunne in his continuall motion, but also to give a certaine limitation to the Starres, who being fixed in any part of the Heauens, that certaine Meridian or Circle of South and North, which passeth through the Center of any Starre, cutteth also in one place or other of the said Zodiacke: which number of degrees so put in the Zodiacke, is the Longitude or distance of the said Starre from the beginning of Aries: Now the Starre (as I said) being so fixed hath no motion, but onely as the whole Frame of the Zodiacke with the eight Spheare, and all the Circles and Starres therein placed, which as is aparant to the sight, is by the first mouer carryed round about from East to West in 24. houres: but the Naturall motion of the said eight Spheare, being from the West to the East, is so slowe, that it is insensible: whereas the Sunne being of a very swift motion in comparison of the former, his motion being euery 24. houres, nere vpon a
Degree

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Deegree little more or lesse, makes his motion from the West to the East in the Zodiacke most apparant in his motion, also describing the Zodiacke Circle, as never declining from the middle thereof: And further, the Sunne being the ruler of the Day, and director of the Night, is the sole and onely distinguisher of Time: For this is apparant to the view of every one, that the Sunne being upon the Meridian above the Horizon, makes the middle of the Day, and being upon the Meridian under the Horizon, makes also the middle of the Night: which being (as I have said) that the Sunne comes alwayes to the Meridian iust at 12. a clocke, it followes necessarily, that what Starre or point in the Zodiacke soever, hath greater Longitude then the Sunne, his right ascension is also greater then the Sunnes: and looke how much the said right ascension is more then the Sunnes, by so much later then the Sunne must the said Starre or point come to the said Meridian, proportionally after 15. degrees to an houre, and one degree to 4. minutes of time.

Take this therefore for a generall rule, that if the right ascension of the Starre, whose time of comming to the Meridian you desire to know, be greater then the right ascension of the Sunne, subtract the Sunnes right ascension from the said Starres right ascension, and the remainder (if it be lesse then 12.) is the houre and minute that the Starre comes to the Meridian after noone: and if the remainder be more then 12. subtract 12. also, and the remainder shewes so many houres and minutes after midnight: But if the Sunnes right ascension be greater then the Starres right ascension, then adde 24. houres to the Starres right ascension, and subtract the Sunnes right ascension there from, as before, the remainder shewes the Starres comming to the Meridian after noone: If it be lesse then 12. or if it be more then 12. twelue also subtracted, the remainder shewes so many houres and minutes after midnight.

As for Example.

The 15. of November, I desire to know at what time Oculus Tauri (or the Bulls eye) will be upon the Meridian: first in the former Table of the Sunnes right ascension, I looke for the 15. of November

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November, where I finde the Sunnes right ascention for that day to be 16. houres and 3. minutes: and in the Kalender or Ephemerides among the fixed Starres, I finde the right ascention of the Bulles eye to be 4. houres 13. minutes: which being lesse then the Sunnes right ascention, I adde 24. houres to 4. houres 13. minutes, and from the totall 28. houres 13. minutes: subtracting 16. houres 3. minutes the Sunnes right ascention, rests 12. houres 10. min. which being more then 12. houres, I take away also 12. houres, and so there rests 10. min. after midnight, that Oculus Tauri comes to the Meridian the said 15. of November.

Againe, the 10. of Aprill, I would know at what time the Lyons taylor will be vpon the Meridian: in this Table I finde the Sunnes right ascention, the day afoze said, to be one houre 51. minutes, and in the Kalender I finde the right ascention of the Lyons taylor to be 11. houres 29. minutes: Then subtracting 1. houre 51. minutes, the Sunnes right ascention, from 11. houres 29. minutes the Starres right ascention, rests 9. houres 38. minutes, shewing that 38. minutes after 9. a clocke at night, the said starre shall be vpon the Meridian.

The Monthly time of each Starres being in rule for obseruation.

January.

Oculus Tauri, the whole constellation of Oryon, Hircus the Goat, the great Dog, the little Dog, the greatest part of Leo, the Crofiers, Canopus, and the South Tryangle.

February.

The whole constellation of Leo, Arcturus, the Centaure, and the Virgins Spike.

March.

The hinder part of Leo, Hydra, Virgins Spike, the Centaure, Arcturus, the Ballance and Scorpio.

Aprill.

The Centaure, Ballance, Scorpio, Lyra, and Sagitarius.



May.

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May.

Scorpio, Lyra, South crowne, and Eagles heart.

Iune.

South Crowne, Eagles heart, Swans tayle, and the Dolphin.

Iuly.

The Dolphin, Fornahand, and Pegasus shoulder.

August.

Fornahand, Pegasus, Cassiopeia, Andromeda, the Whale, and the Ramme.

September.

Cassiopeia, Andromeda, the Whale, the Ramme, Medusa, Perseus, and Eridanus.

October.

All the former of September, and October, Oculus Tauri, Orion, Hircus, and the great Dog, the Crofiers, and Canopus.

Nouember.

All the former of October, with Nouember, the little Dog, and the South tryangle.

December.

The Whale, the Ramme, Medusa, Perseus, Eridanus, Oculus Tauri, Hircus, Orion, Canopus, great Dog, little Dog, Hydra, and Leo, in the months aforesaid, at one time or other of the Night, these starres are vpon the Meridian.

Having sufficiently explained vnto you the manner and way how both by the Sunne and Starres to attaine to the true height of the Pole, or Latitude of any place: I purpose now God willing to speake somewhat of the Longitude: which as the former is most easie, and the finding thereof knowne almost to all Sea-men, so is the other as vncertaine, and hath not yet hitherto beene found out or knowne exactly to any, albeit that many Learned men and of great experience, haue laboured very earnestly for the same, and many good meanes haue they inuented, as helpes and assistance vnto Marriners in their long Nauigations and Trauels, by which, though with great labour, care and industry, they transport themselves to the vtmost Regions of the world, with farre moze ease and facility they might doe it, if they could as perfectly

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perfectly and readily finde the Longitude at all times, as they may the Latitude: for then hauing sayled many dayes in vnknowne pathes vpon the large and spacious Seas, and induring all those vnindurable troubles, miseries, and vnspeakeable calamities, which doe for the most part attend vpon Long-voyages: yet after all this, if vpon the first faire opportunity, they could readily with the Latitude, finde also the Longitude, their forepassed troubles would be ioyfully remedied, being that these two (like louing sisters) would apply much pleasing comfort to their colde stomackes, after their tedious trauels, by giuing them the true p^ricke or place of their then present being. Peter Appian, and Gemma Frisius, hath w^ritten thereof, as also some others: but truely in my opinion, it was neuer brought to such exquisite perfection, as it is now a dayes: and for me to write thereof, were but as it were to set vp a Candle at none dayes, rather to shew mine owne folly, then to lighten those that know a better way then my selfe: in which doing, well may Appelles saying, Ne sutor ultra crepidam, be applyed vnto me: But for my excuse I doe intreate the iudicious to perswade themselves, that it is farre from my thought to set downe any thing in this for a president vnto them, but onely in good will to shew my opinion thereof, to the Ignorant, being as followeth.

First therefore, the Latitude being knowne: by finding the Longitude also, you haue the true p^ricke or place in the Globe, or Cards, where your Ship is, which to finde nearest, is two wayes, one by dead Reckoning, the other by Obseruation: But dead Reckoning (as they call it) being as I take it most bled, I will speake first thereof, by which if it were possible that this reckoning could exactly and precisely be kept, it would giue both Latitude and Longitude without any obseruation at all: The different Latitude being onely the distance that the Ship is departed from the paralell where she last was, either Northward or Southward: and Longitude being the distance that she is departed from the Meridian, either Eastward or Westward: For the knowledge whereof, these things are principally to be considered.

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First, the true pickt or place of the Ships being at the beginning of the Voyage.

Secondly, a sound and experimented iudgement of the way that the Ship maketh, with euery shift of winde.

Thirdly, to know exactly how much the Compasse doth vary from the true North or South point, vpon which the Needle is toucht, either Eastward or Westward, in as many severall places as conveniently may be obserued.

Fourthly, to note diligently the Floods or Currents, which may cause the Ships way to be more Leeward, or otherwise then expectation, and to giue allowance of her course and way accordingly.

Fifthly, the severall points of the Compasse that she makes her course good vpon, and what way she hath made vpon euery point.

Sixtly, to bring those severall courses into one straight line, thereby to know what course she hath made good, with the nearest distance vpon the said point or Rombe, that she hath made her way good vpon.

And lastly, knowing how many leagues both raise or lay a degree vpon the said Rombe, the true reckoning of your said course and distance, giues you the difference of Latitude or the Paralell where the Ship then is: and also knowing how many leagues answer to a degree of east and west in the said paralell, the course, distance and Latit. giues the difference of Longitude or the Meridian, vnder which the ship then is: the intersection of which said paralell and Meridian, is the pickt or place of the ships then being, of which things I will speake more particularly afterward.

Now it resteth to speake something of knowing the Longitude onely by obseruation, which is very necessary to be knowne, that thereby the one may make tryall of the other, being that if the account by dead reckoning, and also by obseruation doe both agree in the Latitude and Longitude, then may you be well assured, that you know truly the place where you then are, which Longitude by obseruation is thus knowne: prepare a very perfect and true running glasse, which may precisely runne 24. houres without error, and about the time that you purpose to set sayle, set the said glasse

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glasse a running iust at twelue a clocke, when the Sunne is vpon the Meridian: and being run out, be sure to turne the said glasse instantly as it is out, not losing any time in the turning of it, and so hauing very warily kept the said Glasse till you thinke good to make an obseruation, at which time it is requisite to haue in readinesse a halfe houre-glasse, and a minute-glasse, that if the 24. houre-glasse be out befoze the Sunne come to the Meridian, then so sone as it is out, to turne the halfe houre-glasse or min. glasse, as you see occasion, thereby to know presently how much the 24. houre-glasse is out befoze the Sunne comes to the Meridian: for if the Sunne is vpon the Meridian iust when the 24. houre-glasse is out, then you may assure your selfe that you haue sayled North or South, and are still vnder the same Meridian that you were at the first: but if the 24. houre-glasse be out befoze the Sunne come to the Meridian, for euery foure minutes that the glasse is out befoze noone, your difference of Longitude is 1. degree to the westward, and for euery houre 15. degrees. And contrary, if the Sun come to the Meridian befoze the glasse is out, then according to the same proportion of time, is your difference of Longitude to the Eastward, which difference of Longitude, if you multiply by the number of miles answerable to a degree of Longitude in that Latitude where you then finde your selfe to be, the product giues the miles of distance, that you are either to the Eastward or westward of the Meridian, that you departed from.

The like may also be effected by any of those fixed Starres, whose true time of comming to the Meridian you know: For if the accompt of time precisely kept by your glasse, and the starres comming to the Meridian, as you finde in your table of right ascension doe iustly agree, then are you still vnder one and the same Meridian, but if the time be past by your accompt, that the said Starre should be vpon the Meridian befoze the Starre doth come to the Meridian, for euery houre that the starre comes to the Meridian after the said time past, your difference of Longitude is 15. degrees to the Westward, and for euery houre that the starre comes to the Meridian befoze, by your accompt, of time truely kept, it should be vpon the Meridian, your difference of Longit.

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is 15. degrees to the Eastward. Thus much shall suffice to haue spoken concerning my opinion for finding the Longitude at Sea by obseruation, and now it rests to speake somewhat of some necessary helpes, for the finding thereof by dead reckoning, as is before promised.

Of the variation of the Compasse.

Concerning the Variation of the Compasse, it hath bene very learnedly treated of by diuers of our owne Countrymen, and in our vulgar tongue, and namely by Maister Norman, and Dr. Burrowes, in their Bookes called the New Attractive, and Variation of the Compasse: And since that, most excellently and ingeniously written of by that rare and learned Mathematician of our time, Maister Wright, in his Booke of the Correction of errors in Nauigation: as also in his Translation called the Hauen-finding Art: In which respect it is needlesse for me here to write any thing thereof: onely let it suffice to speake a little thereof, as being necessary to the knowledge of the foregoing matter, for them that would willingly note how much the Compasse doth vary in several places of their sayling. I thinke it best to haue the Needles of their Compasses touched vpon a good stone, and so placed directly vnder the North point of the Fly, without allowing any Variation at all, the outer edge of the said Fly to be graduated each quarter into 90. degrees, for the ready reckoning of the degr. that the Compasse doth vary from the true North or South, either toward the East or West: ouer which Fly, it is necessary to haue a round Circle of brasse, with two sights vpon the same, the one directly against the other, at opposite points to be raised perpendicularly where occasion shall serue: which circle, with the sights thereon, as I haue said, being placed vpon the glasse, ouer the Fly, within the boxe, where the Compasse is, when you would obserue the Variation of the Compasse iust, either at the Sunnes rising or setting, turne the sights in the brasse circle towards the Sunne, and looking through the same, marke precisely how many degrees, the Sunne riseth or setteth from the East or West point of the Fly or Compasse: For if the Sunne be in the Equinoctiall, hauing then no amplitude, so much as is the difference of the Sunnes rising or setting

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setting from the East or West points, shewed by the Compasse, is the variation of the Compasse, from the true North or South: but if the Sunne be either to the Northward or Southward of the Equinoctiall, hauing amplitude: then is there a respect also to be had to the Sunnes amplitude: as thus, if the Sunne haue North or South amplitude, and that you obserue the Sunne to rise or set so much from the East or West point of the Compasse, as is the Sunnes amplitude, and likewise the same way that the amplitude is, then hath the Compasse no variation: but if the Sun hauing North amplitude, riseth notwithstanding more northerly by your Compasse, then by the said amplitude it should bee, the degrees of true amplitude, deducted from the amplitude, which the Compasse sheweth, leaueth the variation of the Compasse to be Eastward of the north: but if the true amplitude be greater, then the Compasse sheweth, the one deducted from the other, leaueth the variation to the westward of the North: and if the amplitude be southerly, and the Compasse shew the Sunne to rise northerly, both the differences added together, gives the variation easterly: or if the amplitude be Northerly, and the Compasse shewes it to be Southerly, then both the differences added together, giues the variation Westerly. All this is to be vnderstood, when you obserue by the Amplitude Oriue, viz. at the Sunnes rising: for if you obserue the setting thereof, then by adding or deducting the differences betwixt the true amplitude known, and the amplitude giuen by the Compasse, the totall or remaine shewes the Compasse to vary so much to the contrary side: an example will make all this plaine vnto you, which let be thus proposed. Suppose that being at Sea, you finde by the Table of lines hereafter set downe (or by some other meanes) the Suns amplitude at that time to be 20. degr. to the Northward, and setting the Sun at his rising by the Compasse (as is before shewed) you finde that the Sun riseth 35. degr. to the northward of the East, which is some what to the northward of the northeast and by East point, therefore subtracting 20. deg. the Suns true amplitude, from 35. degr. the Amplit. which the Compasse sheweth, the remaine being 15. degr. sheweth the Compasse to be so much varied from the N. to the Eastward,

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which is 1. whole point, and about 1. third : otherwise the Sunne hauing the same amplitude northerly, (as is aforesaid) and setting him at his going downe by the Compasse, the said Compasse sheweth him to set only 5. degrees to the Northward of the west, which deducted from 20. degr. the true amplitude leaueth 15. deg. for the variation of the Compasse to the Eastward, as befoze.

Another Example.

Suppose that the Sunne hauing 23. degrees of South amplitude, and the Compasse sheweth his amplitude or rising to be 11. degrees northerly, adde 23. degrees the true amplitude, with 11. degrees of contrary amplitude, which the Compasse sheweth, and the product 34. degrees, being three whole points and somewhat more, sheweth that the Compasse is so much varied from the true North to the Eastward.

Againe, the Sunne hauing the like amplitude Southerly, you obserue at his setting, and finde by your Compasse that he setteth 11. degr. Northerly, adding the two amplitudes as aforesaid, 23. and 11. the product 34. sheweth the variation so much to the westward, being that in the obseruation at his rising, the East and by North points of the Compasse, standeth where the East South-east should be : and at his setting in the other obseruation, the West and by North points of the Compasse, pointeth to the Sun, in which place should be the West Southwest points.

These few words will suffice, being (that albeit to the Ignorant they seeme somewhat darke) yet in the practise thereof, they shall finde it I doubt not, but very plaine and easie for their vnderstanding; otherwise there are sundry sorts of Instruments to finde the variation by, but others hauing already written thereof, I haue thought good also to shew my opinion of this plaine and easie way, knowing that the Marriner hauing made experience of many wayes, will onely vse that which he findeth best, both for his ease, profit, and truth thereof. And note that whatsoever is here spoken concerning the finding of the variation by the Amplitude, the very like may be also obserued by the Azimuth, which by the Sunne or Starres being to be seene, may at any time be knowne.

How

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How many Leagues sayling vpon any point of the Compasse will raise or lay a degree of Latitude, and what difference of Longitude you make therewith.

This is so common in euery Booke, that I neede not to write thereof, but onely being that it is a necessary helpe to that which hath beene before spoken of, it is not amisse to set it here downe, being as followeth.

First, sayling South or North you keepe still one Meridian: and in sayling 20. English leagues you either raise or depresse the Pole one degree: But if you sayle vpon the first point or Rombe from North or South, either Eastward or Westward, you must sayle 20. Leagues, and one third part to raise or lay a degree of Latitude: and hauing so changed your Paralell one degree, you are also departed from your first Meridian 4. leagues that way which your course was.

Upon the second point or Rombe from North or South 21. leagues and one third, raise or lay a degree of Latitude, and your distance from the first Meridian is 8. leagues and one third.

Sayling vpon the third point 24. leagues, raise or lay a degree and distance from the first Meridian, is 13. leagues and one third.

Upon the fourth point 28. leagues and one third, raise or lay a degr. of Latitude, and distance from the Meridian, is 20. leagues.

Upon the fift point 36. leagues, raise or lay a degree of Latitude, and distance from the Meridian is 30. leagues.

Sayling vpon the first point or Rombe 52. Leagues and one third, raise or lay a degree, and hauing altered your Latitude one degree vpon that point, you are departed from the first Meridian 48. Leagues and one third.

If you sayle vpon the seaunnth point, bring the next from the East or West, you must sayle 102. Leagues, and 2. thirds, before you raise or lay the Pole one degree, and then are you 101. leagues from your first Meridian, but if you sayle East or West, then are you still in a Paralell, and neither raise nor lay the Pole at all.

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To finde the distance betweene any two places, knowing the Longitude and Latitude of them.

If the two places differ onely in Latitude, then are they both vnder one and the same Meridian: and to know the distance betwixt them in miles or leagues, multiply the number of the deg. of difference, by 60. miles, or 20. leagues, the product of which multiplication giues the true distance betweene them in miles or leagues according as you worke them, being that 60. miles or 20. leagues make one degree of a great Circle: but if the one place haue north Latitude, and the other South, then adde both their Latitudes together, and worke as aforesaid: and if both the places are vnder the Equinoctiall, then haue they no Latitude: And there likewise 60. miles, or 20. leagues make one degree, and the working is like the former, if the difference be vnder 180. degrees: For if the difference be more then 180. subtract the said difference from 360. and multiply the remainder by 60. or 20. as before.

These are so plaine and easie that they neede no Examples; but if they differ both in Longitude, and Latitude, or in Longitude onely, in any Paralell beside the Equinoctiall, the working is somewhat more difficult, by reason that the further the Paralels are distant from the Equinoctiall towards either of the Poles, the shorter they are: and the shorter the Paralels are, the fewer minut. or miles make a degree: so that whereas in the Equinoctiall 60. min. or miles make a degree, in that Paralell where the Pole is raised 52. degrees 37. minutes, makes 1. degree, viz. one degree in the Latit. of 52. in running East or West, answers to 37. miles: for which purpose, as also for diuers necessary vses, I haue here added a Table, shewing the miles of distance and minutes of Time, answerable to a degree, in every severall degr. of Latitude, from the Equinoctiall towards either of the Poles: And when you know the miles answerable to a degr. in the Paralell desired, if the difference of the two places be onely in Longitude, multiply the difference of their Longitude by the number of miles answerable to a degree, and the product sheweth the distance in English or Italian miles betwixt the said two places.

Example.

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Example.

London and Middlebrough haue both in a manner one Latit. viz. about 52. deg. and I finde in this Table, that in the paralell of 52, 37. miles make a degree of Longitude, the Longit. of London is 25. deg. 50. min. and the Lon. of Middlebrough is 29. deg. 40. min. which subtracted one from another, leaues 3. deg. 50. min. for the difference of Longit. Then multiplying 3. deg. by 37. miles, the product is 111. miles: then for 50. min. I say by the rule of three, if 60. min. giue 37. miles, what giues 50. minuts? facit nare 31. which added to 111. makes 142. miles, or 47. Leagues, and a mile for the distance betwixt London and Middlebrough.

But if the two places differ both in Longit. and Latitude, then is the working more difficult then either of the former: For first you must take the difference of the 2. places in Longit. and then their difference also in Latit. and multiplying the deg. of their difference in Latitude by 60. set the product thereof by it selfe, for the first Number: then multiply the difference of Longitude, by the number of miles answerable to each Latit. seuerally, and add both the products together: the halfe whereof set downe for your second number, and multiplying each of the said 2. numbers into it selfe squarely, add both the products together, and extracting the square roote thereof, the said square roote is the distance betwixt the two places desired.

As for Example.

To goe directly in a right line from Callice in France, to Constantinople in Grecia: I finde by the Tables following, that the Long. of Callice is 29. deg. 10. min. and the Latit. thereof 50. deg. 40. min. Also the Longit. of Constantinople is 61. degr. 20. min. and the Lat. 44. deg. 40. mi. then subtracting the

Deg. of Latit.	Min. to a Deg.	Deg. of Latit.	Min. to a Deg.
0	60	60	30
10	59	61	29
15	58	62	28
18	57	63	27
21	56	64	26
24	55	65	25
26	54	66	24
28	53	67	23
30	52	68	22
32	51	69	21
34	50	70	20
35	49	71	19
37	48	72	18
38	47	73	17
40	46	74	16
41	45	75	15
42	44	76	14
44	43	77	13
46	42	78	12
47	41	79	11
48	40	80	10
49	39	81	9
51	38	82	8
52	37	83	7
53	36	84	6
54	35	85	5
55	34	86	4
57	33	87	3
58	32	88	2
59	31	89	1

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the lesser Longitude, from the greater, the difference of Longitude is 32. deg. 10. minutes.

Also I take the one Latitude from the other, and there rests 6. degr. for the difference thereof, which 6. degrees multiplied by 60. miles, produceth 360. miles for the distance betwixt the paralell of Callice, and the paralell of Constantinople.

Now for the distance betwixt Callice, and the Meridian of Constantinople, I multiply thirty two degrees 10. minutes, the difference of Longitude by 38. the miles answerable to a degree in the paralell of Callice, and the Product is 1222. miles: Then I multiply thirty two degrees 10. minutes, the aforesaid difference of Longitude by 42. the miles answering to a degree in the paralell of Constantinople, which Product being 1351. miles, is the distance betwixt Constantinople, and the Meridian of Callice: Those two distances added together make 2573. the halfe whereof, being 1286. is the meane distance betwixt the Meridians of the said two places: So haue you two numbers, viz. 360. miles, the distance that the Paralell of Constantinople is to the Southwards of Callice, and 1286. miles, the distance that Constantinople is to the Eastward of the Paralell of Callice: Therefore if you multiply 360. into it selfe, the Product is 129600. and likewise multiplying 1286. into it selfe, the Product is 1653796. which both added together, make 1783396. the square roote of which number is the distance desired: which to helpe those that are not persit in extraction of rootes, I haue here set downe the working thereof as followeth.

The manner how to extract the square and Cube roote of any number is more plainly taught, toward the end of the booke.

First, I set downe the proposed number with a Quotient, and vnder the last figure, I put a prick: and so likewise vnder each other figure toward the left hand, leauing betwixt each prick one figure vnprikt: So haue I vnder this number, 4. prickes signifying that the roote must consist of foure figures, and to finde them out,

I seek

Constantin. 61. degr. 20. min.	} Signot Latit.
Callice 29. degrees 10. minutes	
Difference 32. deg. 10. minut.	
Callice 50. degr. 40. minutes.	} Latit.
Constantin. 44. degr. 40. min.	
Difference 6. degr. 0. minutes.	

1	2	2	2
1	3	5	1
2	5	7	3
1	2	8	6

1653796
129600
—
1783396

1783396	1
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I seeke what is the greatest square number ouer the first prick, which is 1. therefore I put 1. in the quotient for the first figure of the roote, and cancell the figure ouer the first prick: then to finde the 2. figure of the roote, I multiply the quotient $\cdot 1783396 \mid 1$ by 20. which being 1. doth neither multiply nor deuide: therefore I seeke how often 20. is contained in 78. the number of the second prick, which you must take no oftner then that the square of the said number being added therewith may be likewise taken there from, so I see 3. times 20. being 60. and the square of 3. which is 9. added thereto, is 69. which may be taken there from: therefore I put 3. in the quotient, taking 69. from 78. $\cdot 1783396 \mid 13$ the number ouer the 2. prick leaues 933. to the 3. prick: then for the 3. figure of the roote, I multiply 13. the quotient by 20. the product is 260. which I seeke how often it may be taken out of 933. and I find that 3. times 260. is 780. whereunto the square of 3. being added, makes 789. therefore I put 3. in the quotient, and subtracting 789. from 933. rests 14496. for the 4. prick: then for the last figure of the roote, I multiply 133. the whole quotient already found by 20. and the product is 2660. which may be taken 5. times in 14496. for 5. times 2660. is 13300. vnto which 25. the square of 5. added, makes 13325. therefore I put 5. in the quotient, for the fourth and last figure of the roote: and making my subtraction as afores, the worke will stand as you see, by which you may know the square roote of the proposed number to bee 1335. and very neere. So $\cdot 1783396 \mid 1335$ conclude the true distance betwene Callice and Constantinople, to be 1335. miles, and neere halfe a mile. The manner how to extract the roote of any number, is set downe more at large after the Tables of signes,

The

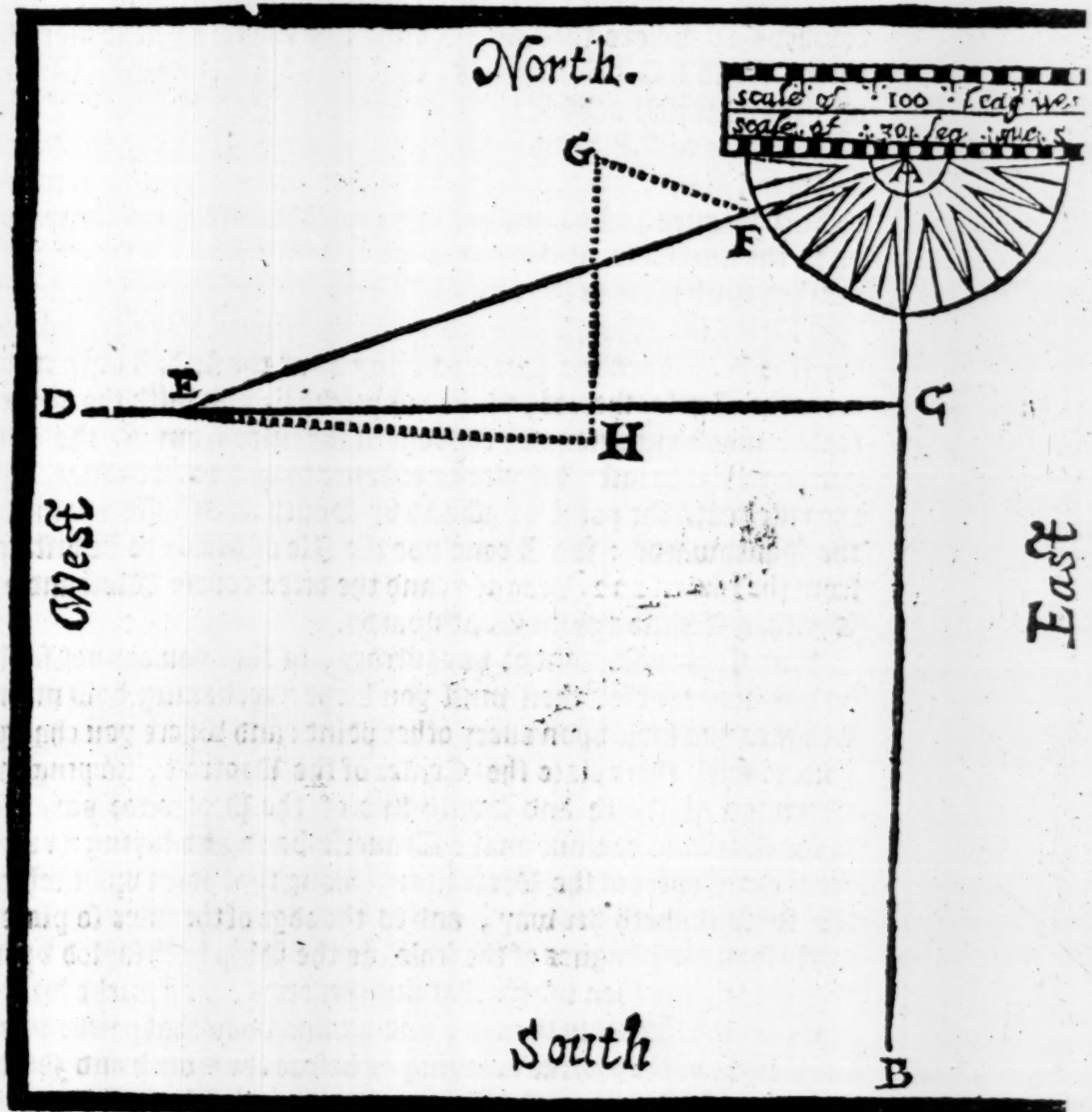
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The ingenious Mariners may sayle by knowing the true Longitude & Latit. of places, to any place assigned, as well by a blanke of paper or pastboard as by his Sea Card, by the helpe of a Protractor, in this manner: First open the board or paper lynes with Meridians and Paralels, or to them that can make a right Angle upon any prick or point, a shete of cleane paper is sufficient to keepe a Trauerse upon, To know your course from the place where you are, to any other place assigned: as I say upon your board or paper make a prick for the place where you then are, and from the said prick draw a right line to represent the Meridian of the same place, then placing the Center of the Protractor upon the said prick, lay the North or South point of the Fly or Protractor, as the place beareth upon the lyne ready drawne. Then by the last Chapter learne the distance of miles betwixt the place where you are, and the Paralell of that place you are bound to: or more briefly, what portion of the Meridian is comprized betwene the Latitude of the two places, that distance by the scale of the Protractor, apply to the Meridian by you drawne, and where the distance ends, draw another line square, or at right angles to the other, either East or West, as the scituation of the place assigned requireth: and by the former Chapter learne the distance betwixt the Meridian by you drawne, and the Meridian of the other place assigned: which knowne (by your Scale) apply that distance to your lyne of East or West, and where that number of distance ends, make another prick for the true scituation of your place assigned, then laying a third or ruler from the Center of the protractor, being the place where you are, and extending it to the other prick last made, the edge of the ruler or lyne shewes upon the protractor, the point of the Compass that the place assigned beares from the place where you are: and the scale applyed to the said line or edge of the ruler, shewes the distance: also the distance may be knowne by extracting the square roote, as is before shewed: an example of this, and for the vse of the Trauerse-board, and so an end.

A Ship being at the Lizard, in the Southwest partes of England, whose Longitude and Latitude I finde in the Table following to be 18. degrees 30. minutes, and 50. degr. 10. minutes, is bound

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bound for an Island in the Ocean Sea called Maida, whose Longitude I finde in the same Table to be 2. degrees 40. minutes, and Latitude 46. degr. 40. min. the difference of their Latitude is 3. deg. 30. min. which is 210. miles, or 70. leagues: Therefore from
Type of a Trauerse boord and a Protractor.



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the prickes point A. I draw the line A. B. in the Trauerse board here adioyning, and vpon the point A. I place the Center of the Protractor being one halfe of the Mariners Compasse, the middle point whereof representing the North or South (as occasion serues) I lay vpon the line A. B. and applying 70. leagues (where of the scale on the edge of the Protractor containes 100.) from A. towards B. where the said 70. ends, I make a prick marked with C. so is A. C. 70. leagues, the distance betwene the Lizard and the Paralell of Maida, then from C. I draw the line C. D. at right angles to A. B. and by the former chapter I finde the distance betwene Maida, and the Meridian of the Lizard to be 629. miles or 209. leagues, and 2. miles: which by the scale aforesaid applied to the line C. D. at the end of the said distance, I set a prick marked with E. so is the line C. E. 209. $\frac{2}{3}$. leagues, the distance that Maida is to the Westward of the Meridian of the Lizard, or the line A. B. then the Protract lying as at the first, I lay a ruler from the Center thereof, to the last prick E. and with the former scale, measuring along by the edge of the ruler from A. the first prick to E. the last: I finde the distance to be 222. Leagues, and the ruler cuts the point West and by South, and halfe a point to the Southwards: So I conclude the Ile of Maida to be distant from the Lizard 222. Leagues, and the direct course West and by South, and halfe a point Southwards.

But if the wind scant or be contrary, so that you cannot sayle by the direct course, then must you keepe a reckoning how many Leagues you sayle vpon euery other point: and where you change your course, there place the Center of the Protract, keeping the Meridian or North and South line of the Protractor paralell, to the Meridian drawne on the Trauerse-board, and laying a ruler from the Center of the Protractor, along that point vpon which the Ship maketh her way, and to the edge of the ruler so placed apply so many Leagues of the scale, as the Ship hath sayled vpon that point, and then where that number ends, set a prick for the place where the Ship then is, and againe vpon that prick place the Center of the protractor laying as befoze the South and North line thereof paralell to the Meridian or South like first drawne,
and

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and then laying a ruler to the center of the Protractor, being the place where the ship then is, and to the place assigned, it shewes upon the Protractor, the point how they beare, and the scale applyed thereto shewes the distance, as in the former example: Having sayled from the Lizard in the right course 30. leagues, being then in the point F. the winde commeth to another point, so that she maketh her way West and by North 40. leagues: at the end of which course is the letter G. from thence she runneth South 75. leagues: at the end of which course is H. then from H. to know the distance, and what course must be kept to the prefired place of Maida marked with E. I place the Center of the Protractor upon H. and the edge thereof, which is then North and South parallel or equidistant to the first line A. B. which so placed, I lay a ruler from the Center thereof to E. and I finde the course to be West, and halfe a point to the North 125. leagues.

Note, that it is necessary to have upon your Protractor two severall Scales, a greater and a lesser, for the greater the Scale is you keepe your reckoning by, the truer shall your accompt be.

Necessary Questions of Nauigation, with their Answers.

Question. 1.

If I sayle from the Paralell of 50. degrees, 70. leagues upon a Southwest course, I demand how much I lay or depresse the Pole, and how many Degrees and Leagues, I depart from the Meridian?

Ans. Pole depressed 2. degr. 28. min. difference of Longitude 3. degr. 25. minutes, leagues from the Meridian 49. and $\frac{1}{2}$.

Q. 2. If I sayle from the Paralell of 40. degrees, upon a West North-west course, until I raise the Pole 3. degr. 30. minutes, I demand how many leagues I have sayled? and how many degrees and leagues I have departed from the Meridian?

A. Leagues sayled 183. difference, Longitude 12. degrees 11. minutes, leagues from the Meridian 169.

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Q 3. From

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Q. 3. From the Paralell of 47. deg. if in sayling 108. leagues betwene west and North, I raise the Pole 3. deg. I demand vpon what Kombe I haue sayled: as also how many degr. and leagues I am from the Meridian, from whence I began that course?

A. A Kombe North west and by west, difference Longitude 6. degr. 36. minutes, leagues from the Meridian 90.

Q. 4. If from the Paralell of 50. degr. I sayle so long betwene North and East, till I raise the Pole 6. degrees, and depart from the Meridian 4. deg. I demand vpon what point of the Compass I haue sayled, and how many leagues I haue runne?

A. The course is neare North northeast, leagues runne 126.

Q. 5. If from the Pararell of 50. degrees I sayle North west, untill I am 4. degr. from the Meridian where I began my course, I demaund how many leagues I haue sayled, and how much the Pole is raised?

A. Leagues sayled 70. and 2. thirds, Pole raised 2. degrees, and a halfe.

Q. 6. Two Ships departing from one place in the Paralell of 50. degrees, the one in sayling 145. leagues towards the West, hath raised the Pole 4. degr. and the other hath raised the Pole 7. deg. and is 95. leagues West from the Meridian of the place from whence he began his course: I demand by what course the said Ships haue sayled, how many leagues the two ships haue sayled, how farre they be a sunder, and by what course they may meete?

A. The first Ship that sayled North west and by West: The second hath sayled North west by North 172. leagues, they are a sunder 63. leagues, and the course betweene them is North north east and South Southwest.

Q. 7. Two Ships departing from one place in the Pararell of 60. degrees, the one in sayling 145. leagues towards the West, hath raised the Pole 4. deg. and the other hath raised the Pole 7. degrees, and is 93. leagues West from the Meridian of the place from whence he began that course: I demand by what course the said Ships haue sayled the way of the 2. Ships, how farre they be a sunder, and by what course they may meete?

A. The first Ship hath sayled North west and by West, the
second

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second hath sayled Northwest and by North 168. leagues, they are a sunder 64. leagues 3. degr. Easterly, course betwene them is North Northeast.

Q. 8. Two ships sayling from one place in the Pararell of 60. deg. the one sayling 180. leagues Eastwards, hath raised the Pole 5. degrees, I demand upon what course, and how many leagues the other Ship shall sayle to bring himselfe 50. leagues North by West from the first Ship, and what they are both departed from their first Meridian?

A. The first Ship hath sayled Northeast and by East, and is departed from the Meridian 146. leagues. The second Ship must sayle Northeast 3. deg. Northerly, leagues 220. and is departed from the Meridian where he began his course 169. leagues.

Q. 9. If I sayle from the Paralell of 50. degr. 100. leagues North, I demand what Latitude I am in?

A. In the Latitude of 55. degrees.

Q. 10. If I sayle from the Paralell of 50. degr. South, till I lay the Pole 5. deg. I demand how many leagues I have sayled?

A. 100. Leagues.

Q. 11. If from Latitude 22. degr. I sayle in the Paralell of 60. deg. 100. leagues East, I demand what Longitude I am in?

A. In Longitude 32. degrees.

Q. 12. If from Longitude 22. degr. I sayle in the Paralell of 50. degr. to Longitude 10. degrees, I demand how many leagues I have sayled?

A. Leagues 154. and a quarter.

Q. 13. If I sayle from Longitude 20. deg. and Latitude 40. to Longitude 350. degr. 27. min. and Latitude 30. degrees, I demand the Course and distance?

A. Course West Southwest, distance 520. leagues.

Q. 14. From Longit. 22. deg. and Latitude 45. deg. northeast 20. leagues, what Longitude and Latit. hath the second place?

A. Twenty three deg. Longitude 45. degr. 42. min. Latitude.

Q. 15. From Longitude 23. degr. and Latitude 45. degr. 42. minutes East and by North 30. leagues, what Longitude and Latitude hath the second place?

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A. 25. degrees 9. min. Longitude 46. degr. 5. min. Latitude.

Q. 16. From Longitude 25. degrees 9. minutes, and Latitude 45 degrees 59. minutes East Southeast 25. leagues. What Longitude and Latitude hath the second place?

A. 26. degrees 46. min. Longitude, 45. deg. 31. min. Latitude.

Q. 17. From Longitude 26. degrees 53. minutes, and Latitude 45. degrees 31. minutes North 40. leagues. What Longitude and Latitude hath the second place?

A. Longitude 26. deg. 53. min. Latitude 47. deg. 31. minutes.

Q. 18. From Longitude 26 degrees 53. minutes, and Latitude 47. deg. 31. min. 50. leagues West Northwest. What Longitude and Latitude hath the second place?

A. Longitude 23. deg. 57. min. Latitude 48. deg. 28. minutes.

Q. 19. From Longitude 23. degrees 57. minutes, and Latitude 48. deg. 28. min. East Northeast 60. leagues. What Longitude and Latitude hath the second place?

A. Longitude 28. degrees 27. minutes, Latitude 49. degrees 26. minutes.

Heere followeth a briefe Table of Sines for Arithmetical Calculation, the totall sine whereof is 10000. with certaine necessary Propositions to be wrought thereby, by which few things proposed, and Examples there-to annexed, any one that hath either an ingenious spirit, or a willing minde to the practise of the Mathematicall Sciences, may attaine to much knowledge therein.

A briefe declaration of the same.

VVhat the Table of Sines is, hath beene very Learnedly explained by others, and therefore needlesse is it for me to discourse thereof; onely take these few instructions for the helpe of those, which as yet haue no knowledge therein. First know, that

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that sayling, which is the principall thing here aymed at, is perfozmed by a true and perfect knowledge of the Spheare, by the pzo-tection whereof, all Calculations, Tables calculated, and Instru-ments for obseruation are inuented, pzotracted, framed and made.

What the Spheare is I need not to discusse, the chiefe or great Circles thereof consisting of 360. degrees, and one quarter thereof being 90. degrees, which quarter being taken from the whole Circumference, consisteth of these thze particulars, viz. An arch or part of a Circle being indeed 90. degr. or a quarter of the whole Circle: a right Angle, and two equall sides thereto, of which the one is the base or ground lyne, the other a perpendicular let fall thereon at right angles, the utmost ends or extentions, of which two lines are the limits of the foresaid arch, or quarter of a Circle: the which thze partes so fitted together in their due order, sheweth the perfit platfozme of one quarter of the whole Circle, commonly called a Quadzant: the base or ground line whereof being deuided into 10000. equall parts, is Sinus totus or the whole line: and the whole arch or quarter of a Circle into 90. degrees, is the whole arch belonging to the said whole line.

Within which Quadzant, any number of degrees or minutes counted from the beginning or first perpendicular may be called an arch, or part of a circle: and another perpendicular let fall there from to the aforesaid base or ground line, the number of equall parts that the said perpendicular falleth vpon, is the right line to the arch giuen: and the complement of the arch giuen, is the remainder thereof, it being taken from 90. degr. or the whole Quadzant. To finde out the right Sine of any giuen Arch, loke in the head of the Table following for the degrees thereof, and if there be any minutes therewith, loke for the minutes at the left side of the Table, and carrying your eye downeward from the degree, till you come right against the minutes, the number which you finde in the common Angle to them both, is the right sine of your giuen Arch desired: as if you desire the Sine of 35. degrees 20. minutes, loke in the head of the Table for 35. and vpon the left side thereof for 20. and in the common square or angle right against them both, you shall finde 5783. which is the sine of 35. de-
grees

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grées 20. minutes, and if you subtract 35. degrés 20. minutes from 90. degrés, the remainder 54. degrés 40. minutes is the complement thereof, whose right line (found as before is taught) is 8158. what the versed sine is, and how found out, is afterward shewed. I doubt not but that these few words will suffice for the explaining of the Table following, whose large and ample verses for Navigation and other the Mathematicall practises these following exemplary Propositions, will in some reasonable sort make manifest: by which few here proposed and answered, the ingenious may gather the manifold uses thereof, being that indeed the benefit to be reaped thereby is great, and the propositions to be wrought thereby infinite. Who so desires more perfection in this kinde of Navigation, and generally in all Mathematicall practises, let them spend some time in the study of Pitiscus; of the Doctrine of Triangles, not long since translated and published in our English tongue by Mr. Raph Handson.

Certaine Propositions to be wrought by the Table of Sines.

The Sunnes true place being knowne, to finde his Declination. Prop. I.

As the whole Sine is to the sine of the greatest Declination, so is the sine of the Sunnes distance from the nearest Equinoctiall point, to the sine of the Declination for the day proposed.

Example.

I would know the Declination of the Sun the 1. of May, 1626. at what time the true place of the Sun being in 20. degr. 36. min. of Taurus, is 50. deg. 36. min. from the beginning of Aries, or the vernal Equinoctiall point, therefore I must multiply the sine of 50. deg. 36. min. the Suns distance from the Equinoctiall point by the sine of 23. deg. 31. min. the greatest Declinat. and that product must be deuided by the whole sine, whose several lines being found out in the table following, & set in order, the work will stand thus:

— If 90	giue	23.31	what	50.36
10000.		3990		7727

Facit, 3083. whose nearest arch 17. 57. min. is the true Declination of the Sunne, the day and yeare aforesaid.

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The Declination of the Sunne giuen, to finde his place in the
Zodiacke. Prop. 2.

As the line of the greatest Declination is to the whole line, so
is the line of [the Declination for the day proposed to the
Sunnes place or distance from the nearest Equinoctiall point.

Example.

The first of May, 1626. I finde that the Declination of the Sun
is 17. degrees 57. minutes North, therefore I say:

If 23.31.	giue	90	what	17.57
3990		10000		3083

Each nearest to 7727. whose arch 50. degrees 36. min. is the
Sunnes distance from the vernal Equinoctiall point of Aries,
from which taking 30 degrees the whole line of Aries, the remain-
er 20. degr. 36. minutes, shewes the Sunne to be so much entred
into Taurus, which is the next signe.

The Latitude and Declination of the Sunne giuen,
to finde the Amplitude.

Prop. 3.

As the line of the Complement of the Latitude is in propor-
tion to the whole signe, so is the line of the Sunnes Declina-
tion to the Amplitude.

Example.

The 10. of Aprill 1628. I desire the amplitude of the Sunne
viz. how much the Sunne doth rise and set from the true East and
West point of the Horizon, towards the North or South in the
Latitude of 51 deg. 40. min. to know which, the worke is thus:

If 38. degrees 20. minutes, the complement of the Latitude,
giue 90. degrees the arch of the whole line, what giues 11. degr.
48. min. the Declination of the Sunne?

38. deg. 20. min.	90	11.48. minutes.
6202	10000	2045

Facit 3297. nearest whose arch sought out in the Table of lines,
is 90. degr. 15. min. for the amplitude in the day, yeare and place
proposed: the same denided by 11. and 1. quarter, the number of
degrees that belongs to a point of the Compass, betweth one

4

point

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point and 8. degrees, which the Sunne riseth and sets to the Northward of the East and West, being that the Declination is North, for if the Declination were South, then were the Amplitude southerly.

The Declination and Amplitude of the Sunne giuen,
to finde the height of the Pole.

Prop. 4.

As the Sine of the Amplitude is in proportion to the sine of the Declination, so is the whole sine to the sine of the complement of the Latitude.

Example.

The Declination 11. degrees 43. min. and the Amplitude 19. degr. 7. minutes, I demaund the height of the Pole: Say,

If 19.7.	giue	11.43	what	90.
3275.		2031.		10000.

Facit, 6202. nearest whose arch in the Table of sines being 38. degrees 20. minutes is the height of the Equinoctiall, to the complement of the Latitude: that subtracted from 90. degrees, leaues 51. degrees 40. min. for the height of the Pole or Latitude of the place desired.

The true place and Declination of the Sunne giuen, to finde
the right ascension. Prop. 5.

As the Sine of the Complement of the Declination is to the totall sine, so is the sine of the complement of the Sunnes distance from the beginning of Aries, to the Complement of the right ascension.

Example.

I desire the right ascension of the Sun the 20. of Aprill, 1625. being then in 10. deg. 14. min. of Taurus, at which time his Declination is 14. degrees 56. min. and the complement thereof 75. deg. 4. min. and the distance from the beginning of Aries 40. deg. 14. min. whose complement is 49. degrees 49. minutes: I say then

If 75.4.	giue	90	what	49.46. minutes?
9663		10000		7634.

Facit,

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Facit, 7900. whose arch in the Tables of Lines is 52. degrees 11. minutes, the complement whereof 37. degrees 49. min. is the Sunnes right ascention: the same conuerted into houres by allowing 15. deg. to an houre, giues 2. houres and 31. minutes.

This is to be understood, when the Sunne is betwixt the beginning of Aries, and the Tropicke of Cancer, so; if the Sunne be in the Tropick of Cancer, then is the right ascention 90. degrees 02 6. houres: and if the Sunne be betwixt the Tropick of Cancer, and the Equinoctiall point of Libra, subtract the distance that the Sun is from the beginning of Aries, out of 180. degrees, and with the remainder worke as befoze so; the right ascention, which ascention so found, take from 180. and the remaine is the right ascention desired. But if the Sunne be betwixt the Equinoctiall of Libra, and the Tropick of Capricorne, subtract the said distance from the beginning of Aries, out of 270. degrees, and if betwixt the Tropick of Capricorne, and the beginning of Aries, take the said distance out of 360. degrees, and then worke as befoze. One example or two will make all this plaine vnto you.

The last of Iune 1626. the true place of the Sunne 17. degrees 51. min. of Cancer, is 107. degr. 51. minutes from the beginning of Aries, which taken from 180. leaues 72. degr. 9. min. whose complement is 17. deg. 51. minutes, the Sunnes declination being then 22. deg. 20. min. the complement thereof 67. degrees 40. minutes. Say then,

If 67.40	giue	90	what	17.51. minutes?
9250.		10000.		3065.

Facit, 3314. whose arch is 19. degr. 21. min. the complement whereof 70 degrees 39. min. taken from 180. leaues 109. degr. 21. min. so; the right ascention desired, which conuerted into houres, makes 7. houres 16. minutes. Againe, I desire the right ascention of 20 degrees 40. minutes of Capricornus, whose distance in continuall proceeding from the beginning of Aries, being 290. degrees 40. minutes, taken from 360. leaues 69. deg. 20. minutes, with the complement whereof 20. degr. 40. min. and the complement of the Declination of the Sunne vpon the same point of the Sunnes place 68. deg. 6. minutes, I worke as followeth:

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If 68.6. giue 90 what 20.40
 9278 10000 3529

Facit 3803. whose arch is 22. degrees 21. minutes, the Complement whereof 67. degr. 39. min. taken from 360. leaues 292. degr. 21. min. for the right ascension desired, the same conuerted into houres, is 19. houres 29. minutes.

The Latitude and Declination of the Sunne knowne, to
 finde the difference ascensionall.

Prop. 6.

As the sine of the complement of the Latitude is to the sine of the Latitude, so is the sine of the Declination to the quotient found : againe, as the sine of the complement of the Declination is to the whole sine, so is the said quotient found to the difference ascensionall.

Example.

I would know the difference ascensionall when the Declination is 20. degrees 6. minutes, and the Latitude 51. degrees 40. minutes : I say,

If 38.20. giue 51.40. what 20.6.
 6202 7844 3437.

Facit 4346. for the quotient found : then againe I say

If 69.54 giue 90 what
 9391 10000 4346.

Facit 4627. whose arch in the Table of sines, 27. degrees 34. min. is the difference ascensionall for the day proposed : the same reduced into houres and minutes, makes one houre and 50. minutes, which taken from 6. a clocke, the houre that the Sunne riseth, being in the Equinoctiall, leaueth 4. houres 10. minutes, at what time the Sunne then riseth, and the said ascensionall difference added to 6. a clocke, makes 7. a clocke, 50. minutes, for the Sunne rising.

Again, the said ascensionall difference doubled and added to 12. houres, the time from 6. in the morning till 6. at night, makes 15. houres 40. minutes, for the whole length of the day.

This is when the Sunne hath North declination, for if t he
declination

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declination be South, then the ascensionall difference added to 6. a clocke, giues the Sunnes rising, and taken from 6. leaues the setting, and being doubled and taken from 12. houres, leaues the length of the day as aforesaid.

The Amplitude and difference ascensionall of the Sunne or
Starres giuen, to finde the Declination.

Prop. 7.

As the sine of the time of the Sunnes rising, conuerted into degrees and minutes, is to the sine of the complement of the Amplitude, so is the whole sine to the sine of the complement of the Declination.

Example.

The difference ascensionall being 27. degrees 34. minutes, shewes the Sunne to rise at 4. a clocke 10. minutes, which conuerted into degrees, makes 62. degrees 30. minutes, and the amplitude being found as before is shewed in the third Proposition, is 33. degr. 38. min. and the complement thereof 56. degrees 22. minutes. Say then,

If 62.30.	giues	56.22	what	90
8870		8326		10000

Facit, 9386. whose arch 69. degrees 50. minutes, the complement thereof 20. deg. 10. min. is the Declination desired.

The Latitude and Declination giuen, to finde the Meridionall Altitude, Prop. 8.

If the Sunne haue North Declination, adde the complement of the Latitude with the Declination, the product is the Meridionall Altitude.

Example.

If the Declination be 23. degr. 30. min. North, and the Latitude 51. degrees 40. minutes, the Complement thereof 38. degr. 20. added with 23. 30. minutes, makes 61. degrees 50. minutes, for the Meridian altitude: but if the Declination be 23. degr. 30. South, and the Latitude 51. degrees 40. minutes, subtract 23. degrees 30. min. the Declination from 38. degrees 20. minutes, the

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the complement of the Latitude, and the remainer 14. degrees 50 minutes is the altitude desired: and if the Sunne be in the Equinoctiall, hauing no Declination, then is the Meridian altitude equall to the complement of the Latitude.

The Latitude and Declination knowne, to finde the height of the Sunne at any houre of the day.

Prop. 9.

First you are to consider, whether the Sunne be in the Equinoctiall, or whether he hath North or South declination, for if the Sunne be in the Equinoctiall, then as the whole sine is to the sine of the complement of the Latitude, so is the sine of the complement of the Sunnes distance from none, allowing 15. degr. for every houre to the sine of the altitude desired.

Example.

At any yeare or day; the Sunne then hauing no declination, the Latitude 51. degrees 40. minutes, I desire the Sunnes height at 9. a clocke before none, or at thre afternone, the complement of the Latitude is 38. degrees 20. minutes and the houres distance from none, 45. degrees whose complement is also 45. degrees. Say then,

If 90.	gine	38.20.	what	45.
		10000.		6202.
				7071.

Facit 4385. whose arch 26. deg. is the height of the Sunne above the Horizon, the time and place proposed.

If the Sunne haue declination, then is the working somewhat more tedious, except only at 6. a clock, either before or after none, for which houre, as the whole sine is to the sine of the Latitude, so is the sine of the Declination, to the sine of the Altitude.

Example.

The 10. of Aprill, 1624. the Latitude 51. degrees 40. min. and the Declination 11. deg. 48. minutes. Say,

If 90	gine	51.40.	what	11.48
		10000.		7844.
				2045.

Facit, 1604. whose arch 9. deg. 14. min. is the Altitude desired. But for any other houre of the day if it be lesse then 6. houres.

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02 90. degrees, worke as folloves, multiply the sine of the houres distance from none by the sine of the complement of the Latitude, the Product deuide by the whole sine, and the arch of the quotient taken from 90. set apart for the number first found, which number so found, compare with the Latitude, then multiply the whole sine, by the sine of the lesser, and deuide the Product thereof by the sine of the greater: and to the complement of the arch of the Product adde the Declination of the Sunne, if the Declination be Northerly, or subtract if the Declination be Southerly, and if the Product or remaine be more then 90. degrees, take it from 180. and the rest is the second found number, which two numbers so knowne,

As the whole Sine is to the number first found, so is the second found number to the Altitude desired.

Example.

Any yeare and day at 9. a clocke, the Latitude 51. degrees 40. min. the distance of the Sunne from none 45. degr. and the Declination 11. deg. 43. min. I desire the Sunnes height: Say,

If 90. giue 38.20. what 45.
10000. 6202. 7071.

Facit 4385. whose arch 26. deg. taken from 90. leaues 64. deg. for the first found number, then comparing the Latitude, and it together, the Latitude being the lesser, I multiply the whole sine by the sine thereof, and deuide by the sine of the first found, saying,

If 64. 0. giue 51.40. what 90.
8988. 7844. 10000.

Facit, 8727. whose arch being 60. deg. 46. min. to the Complement thereof 29. deg. 14. min. I adde the Declination 11. deg. 43. min. and the totall 40. degr. 57. min. is the second found number, which two numbers so knowne, say againe,

If 93. giue 64. 0. what 40.57.
10000. 8988. 6554.

Facit, 5890. whose arch 36. deg. 5. minutes, is the Altitude of the Sunne desired.

Againe, if the houre for which you desire the Sunnes height, be more then 6. houres or 90. degrees from the Meridian, you

must

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must subtract the said distance from 180. and multiply the sine of the remainder, by the sine of the complement of the Latitude, which product being divided by the whole sine, the complement of the quotients arch is the first found number, the sine whereof compare with the sine of the Latitude, multiplying the whole sine by the lesser: and dividing the product by the greater: from the arch of which quotient, if you take the complement of the Declination, you have the second found number, the sine whereof multiplied by the sine of the first found, and the product divided by the totall sine, the quotients arch is the Altitude desired.

Example.

At 5. in the morning, the Latitude 51. Deg. 40. min. the houres distance from none 7. or 105. Deg. which deducted from 180. leaues 75. Deg. for the hours distance. Say then,

If 90. sine 38.20. what 75.0.
10000. 6202. 9659.

Facit, 5990. whose arch being 36. Deg. 48. min. the complement thereof 53. 12. is the first found number: Say then againe.

If 53.12. sine 51.40. What 90.
8007. 7844. 10000.

Facit, 9796. from whose arch 78. Deg. 25. min. taking 78. Deg. 17. min. the complement of the Sunnes declination, rests 8. min. for the second found number, which 2. numbers found, Say,

If 90. sine 53.12. what 08.
10000. 8007. 023.

Facit, 18. whose arch 6. min. is the height of the Sunne above the Horizon at 5. in the morning, or 7. in the evening, the day and time aforesaid.

The Latitude giuen, to finde how many minutes or miles
of the Equinoctiall, make a degree of Lon-
gitude in any Paracell.

Prop. 10.

As the whole sine is in proportion to 60. so is the sine of the complement of the Latitude, to the miles answerable to a degree in the Latitude desired.

I desire

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I desire to know how many miles in running East or West in the Latitude of 51. degrees 40. minutes, will alter one degree of Longitude? Say,

If 90. giue 60. what 38.20.
10000. 6202.

Facit, 37. for the number of miles, answerable to a degree, in the Latitude desired.

The course and distance giuen, to finde out the
difference of Latitude.

Prop. 11.

As the whole sine is to the miles of way runne, so is the sine of the courses distance from East to West, to the minutes of difference of Latitude.

Example.

Running West southwest, which is 22. degrees 30. minutes, from the West 75. leagues or 225. miles, I demand the difference of Latitude? Say,

If 90. giue 225. what 22.30.
10000. 3827.

Facit, 86. minutes or one degree 26. min. for the difference of Latitude upon the said course and distance.

By course and distance giuen, to finde the difference
of Longitude. Prop. 12.

As the whole sine is to the miles of way that you haue runne, so is the sine of the degrees that your course is distant from South or North to the miles that you are departed from your first Meridian.

Example.

Running North west and by North which is 33. degr. 45. min. from the North 60. leagues or 180. miles, I demand the difference of Longitude? Say,

If 90. giue 180. what 33.45.
10000. 5556.

Facit, 100. miles which you are departed from the Meridian
to

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to the westward, which if you deuide by the number of miles answerable to a degree of Longitude, in the Latitude where you then finde your selfe to be, the quotient giues you the degr. and min. of the difference of Longitude.

By the distance, and departure from the Meridian
giuen, to finde the course.

Prop. 13.

As the miles of distance that you haue runne, is in proportion to the whole sine, so is the miles of your departure from the Meridian to the sine of your course from South or North.

Example.

Being departed from the first Meridian 75. miles in the running of 50. leagues, or a 150. miles, I demaund vpon what point I haue sayled, it being betwixt South and West: Say,

If 150 giue 10000. what 75.

Facit, 5000. whose arch 30. degr. is the distance from South towards West that the course is, which is Southwest and by South southerly.

The Latitude, Declination and height of the Sunne giuen,
to know the houre of the day.

Prop. 14.

Adde the complement of the Latitude, and the Declination together, and from the sine of the totall, subtract the sine of the Altitude obserued, the remainer is your number first found, which number first found, multiply by the whole sine, and deuide by the sine of the complement of the Latitude, the quotient whereof is the second found number, which second number so knowne, as the sine of the complement of the Declination is to the totall sine, so is the said second found number to the quotient, which quotient taken from the whole sine, the complement of the arch to the remainer, is the Sunnes distance from none in degrees and minutes.

Example.

The 15. of May, 1625. the Declination 21. deg. 4. minutes, and the

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The Complement of the Latitude 38. degrees 20. minutes added together, is 59. degrees 24. minutes, the sine thereof 8607. the height of the Sunne observed 48. degrees 30. min. the sine thereof 7490. the which taken from the former number, leaues 1117. for the first found number: then I say,

If 38.20	giue	90	what
6202.		10000	1117.

Facit, 1801. for the second found number. Againesay,

If 68.56	giue	90	what
9332		10000	1801.

Facit, 1929. which taken from 10000. leaues 8071. whose arch 53. degrees 49. minutes subtracted from 90. leaues 36. degrees 11. minutes, for the Sunnes distance from the Meridian: that converted into houres, is 2. houres 24. minutes from noone, when the Sunne is so high as aforesaid.

To finde the *Sinus versus* of any giuen Arch.

Prop. 15.

If the Arch giuen, be lesse then 90. subtract it from 90. and the sine of the remainer taken from the totall sine, leaues the Sinus-versus, but if the giuen Arch be greater then 90. degrees, subtract 90. degrees there-from, and seeke the sine of the remainer, which is alwayes the complement of the giuen Arch: which Sinus added to the whole sine, and the totall thereof is the Sinus versus of the giuen Arch desired.

Example.

To know the Sinus versus of 47. degrees 12. minutes, the complement thereof is 42. degrees 48. minutes, whose sine 6794. taken from 10000. the whole sine resteth 3206. the reuerfed sine of 47. degrees 12. minutes.

Likewise, to know the reuerfed sine of 137. degrees 25. min. which is moze then 90. degrees, taking 90. there-from, there resteth 47. degrees 25. minutes, the Sinus whereof 7363. added to the whole sine, maketh 17363. for the reuerfed sine of 137. degrees 25. minutes.

A Table of Sines.

The Degrees of the Quadrant.

M.	0	1	2	3	4	5	6	7	8	9
1	3	177	352	526	700	874	1048	1222	1395	1567
2	6	180	355	529	703	877	1051	1224	1398	1570
3	9	183	353	532	706	881	1054	1227	1400	1573
4	12	186	361	535	709	883	1057	1230	1403	1576
5	14	188	362	538	712	886	1060	1233	1406	1579
6	17	192	366	541	715	889	1063	1236	1409	1582
7	20	195	369	544	718	892	1065	1239	1412	1584
8	23	198	372	547	721	895	1068	1242	1415	1587
9	26	201	375	549	724	898	1071	1245	1418	1590
10	29	204	378	552	727	900	1074	1247	1421	1593
11	32	206	381	555	729	903	1077	1250	1424	1596
12	35	209	384	558	732	906	1080	1253	1426	1599
13	38	212	387	561	735	909	1083	1256	1429	1602
14	41	215	390	564	738	912	1086	1259	1432	1605
15	44	218	393	567	741	915	1089	1262	1435	1608
16	46	221	395	570	744	918	1091	1265	1438	1610
17	49	224	398	573	747	921	1097	1268	1441	1613
18	52	227	401	576	750	924	1094	1271	1444	1616
19	55	230	404	578	753	927	1100	1273	1446	1619
20	58	233	407	581	756	930	1103	1276	1449	1622
21	61	235	410	584	758	932	1106	1279	1452	1625
22	64	238	413	587	761	935	1109	1282	1455	1627
23	67	241	416	590	764	938	1112	1285	1458	1630
24	70	244	419	593	767	941	1115	1288	1461	1633
25	73	247	422	596	770	944	1118	1291	1464	1636
26	76	250	425	599	773	947	1120	1294	1467	1639
27	78	253	427	602	776	950	1123	1297	1469	1642
28	81	256	430	605	779	953	1126	1299	1472	1645
29	84	259	433	608	782	956	1129	1302	1475	1648
30	87	262	436	610	785	959	1132	1305	1478	1650

A Table of Sines.

The Degrees of the Quadrant.

M.	0	1	2	3	4	5	6	7	8	9
31	92	265	439	613	787	961	1135	1308	1481	1653
32	93	268	442	616	790	964	1138	1311	1484	1656
33	96	270	445	619	793	967	1141	1314	1487	1659
34	96	273	448	622	796	970	1144	1317	1490	1662
35	102	276	451	625	799	973	1146	1320	1492	1665
36	105	279	454	628	802	976	1149	1322	1495	1668
37	107	282	456	631	805	979	1152	1325	1498	1670
38	110	285	459	634	808	982	1155	1328	1501	1673
39	113	288	462	637	811	985	1158	1331	1504	1676
40	116	291	465	640	814	987	1161	1334	1507	1679
41	119	294	468	642	816	990	1164	1337	1510	1682
42	122	297	471	645	819	993	1167	1340	1513	1685
43	125	300	474	648	822	996	1170	1343	1515	1688
44	128	302	477	651	825	999	1172	1346	1518	1691
45	131	305	480	654	828	1002	1175	1348	1521	1693
46	134	308	483	657	831	1005	1178	1351	1524	1696
47	137	311	485	660	834	1008	1181	1354	1527	1699
48	140	314	488	663	837	1011	1184	1357	1530	1702
49	142	317	491	666	840	1013	1187	1360	1533	1705
50	145	320	494	668	843	1016	1190	1363	1536	1708
51	148	323	497	671	845	1019	1193	1366	1538	1711
52	151	326	500	674	848	1022	1196	1369	1541	1714
53	154	329	503	677	851	1025	1198	1372	1544	1716
54	157	331	506	680	854	1028	1201	1374	1547	1719
55	160	334	509	683	857	1031	1204	1377	1550	1722
56	163	337	512	686	860	1034	1207	1380	1553	1725
57	166	340	515	689	863	1037	1210	1382	1556	1728
58	169	343	517	692	866	1039	1213	1386	1559	1731
59	172	347	520	695	869	1042	1216	1389	1561	1734
60	174	350	523	697	871	1045	1219	1392	1564	1736

A Table of Sines.

The Degrees of the Quadrant.

M.	10	11	12	13	14	15	16	17	18	19
1	1739	1911	2082	2252	2422	2591	2759	2926	3093	3258
2	1742	1914	2085	2255	2425	2594	2762	2929	3096	3261
3	1745	1917	2088	2258	2428	2597	2765	2932	3098	3264
4	1747	1919	2090	2261	2430	2599	2767	2935	3101	3267
5	1750	1922	2093	2264	2433	2602	2770	2938	3104	3269
6	1753	1925	2096	2267	2436	2605	2773	2940	3107	3272
7	1756	1928	2099	2269	2439	2608	2776	2943	3109	3275
8	1759	1931	2102	2272	2442	2611	2779	2946	3112	3278
9	1762	1934	2105	2275	2445	2613	2781	2949	3115	3280
10	1765	1937	2107	2278	2447	2616	2784	2951	3118	3283
11	1767	1939	2110	2281	2450	2619	2787	2954	3120	3286
12	1770	1942	2113	2283	2453	2622	2790	2957	3123	3289
13	1773	1945	2117	2286	2456	2625	2793	2960	3126	3291
14	1776	1948	2119	2289	2459	2628	2795	2963	3129	3294
15	1779	1951	2122	2292	2462	2630	2798	2965	3132	3297
16	1782	1954	2125	2295	2464	2633	2801	2968	3134	3300
17	1785	1957	2127	2298	2467	2636	2804	2971	3137	3302
18	1788	1959	2130	2300	2470	2639	2807	2974	3140	3305
19	1790	1962	2133	2303	2473	2641	2809	2976	3143	3308
20	1793	1965	2136	2306	2476	2644	2812	2979	3146	3311
21	1796	1968	2139	2309	2478	2647	2815	2982	3148	3313
22	1799	1971	2142	2312	2481	2650	2818	2985	3151	3316
23	1802	1974	2145	2315	2484	2653	2821	2988	3154	3319
24	1805	1977	2147	2317	2487	2655	2823	2990	3156	3322
25	1808	1979	2150	2320	2490	2658	2826	2993	3159	3324
26	1810	1982	2153	2323	2492	2661	2829	2996	3162	3327
27	1813	1985	2156	2326	2495	2664	2832	2999	3165	3330
28	1816	1988	2159	2329	2498	2667	2835	3001	3167	3332
29	1819	1991	2161	2331	2501	2669	2837	3004	3170	3335
30	1822	1994	2164	2334	2504	2672	2840	3007	2173	3338

A Table of Sines.

The Degrees of the Quadrant.

M.	10	11	12	13	14	15	16	17	18	19
31	1825	1996	2167	2337	2507	2675	2843	3010	3176	3341
32	1828	1999	2170	2340	2509	2678	2846	3013	3178	3343
33	1830	2002	2173	2343	2512	2681	2848	3015	3181	3346
34	1833	2005	2176	2346	2515	2683	2851	3018	3184	3349
35	1836	2008	2178	2349	2518	2686	2854	3021	3187	3352
36	1839	2011	2181	2351	2521	2689	2857	3024	3189	3354
37	1842	2014	2184	2354	2524	2692	2860	3026	3192	3357
38	1845	2016	2187	2357	2526	2695	2862	3029	3195	3360
39	1848	2019	2190	2360	2529	2698	2865	3032	3198	3363
40	1850	2022	2193	2363	2532	2700	2868	3035	3201	3365
41	1853	2025	2195	2365	2535	2703	2871	3037	3203	3368
42	1856	2028	2198	2368	2538	2706	2874	3040	3206	3371
43	1859	2031	2201	2371	2540	2709	2876	3043	3209	3374
44	1862	2034	2204	2374	2543	2712	2879	3046	3212	3376
45	1865	2036	2207	2377	2546	2714	2882	3049	3214	3379
46	1868	2039	2210	2380	2549	2717	2885	3051	3217	3381
47	1870	2042	2213	2382	2552	2720	2887	3054	3220	3385
48	1873	2045	2216	2385	2555	2723	2890	3057	3223	3387
49	1876	2048	2218	2388	2557	2726	2893	3060	3225	3390
50	1879	2051	2221	2391	2560	2728	2896	3062	3228	3393
51	1882	2053	2224	2394	2563	2731	2899	3065	3231	3396
52	1885	2056	2227	2397	2566	2734	2901	3068	3234	3398
53	1888	2059	2230	2399	2568	2737	2904	3071	3236	3401
54	1891	2062	2231	2402	2571	2740	2907	3073	3239	3404
55	1894	2065	2235	2405	2574	2742	2910	3076	3242	3406
56	1896	2068	2238	2409	2577	2745	2913	3079	3245	3409
57	1899	2070	2241	2411	2580	2748	2915	3082	3247	3412
58	1902	2073	2244	2414	2583	2751	2918	3085	3250	3415
59	1905	2076	2247	2416	2585	2754	2921	3087	3253	3417
60	1908	2079	2249	2419	2588	2756	2924	3090	3256	3420

A Table of Sines.

The Degrees of the Quadrant.

M.	20	21	22	23	24	25	26	27	28	29
1	3423	3586	3749	3910	4070	4229	4386	4542	4697	4851
2	3426	3589	3751	3913	4073	4231	4389	4545	4700	4853
3	3428	3592	3754	3915	4075	4234	4391	4548	4702	4856
4	3431	3594	3757	3918	4078	4237	4394	4550	4705	4858
5	3434	3597	3759	3921	4081	4239	4396	4553	4707	4861
6	3437	3600	3762	3923	4083	4242	4399	4555	4710	4863
7	3439	3603	3765	3926	4086	4245	4402	4558	4713	4866
8	3442	3605	3768	3929	4089	4247	4404	4561	4715	4868
9	3445	3608	3770	3931	4091	4250	4407	4563	4718	4871
10	3447	3611	3773	3934	4094	4252	4410	4566	4720	4873
11	3450	3613	3776	3937	4096	4255	4412	4568	4723	4876
12	3453	3616	3778	3939	4099	4258	4415	4571	4725	4878
13	3456	3619	3781	3942	4102	4260	4418	4573	4728	4881
14	3458	3622	3784	3945	4104	4263	4420	4576	4731	4883
15	3461	3624	3786	3947	4107	4266	4423	4579	4733	4886
16	3464	3627	3789	3950	4110	4268	4425	4581	4736	4888
17	3467	3630	3792	3953	4112	4271	4428	4584	4738	4891
18	3469	3632	3794	3955	4115	4274	4431	4586	4741	4893
19	3472	3635	3797	3958	4118	4276	4433	4589	4743	4896
20	3475	3638	3800	3961	4120	4279	4436	4592	4746	4898
21	3477	3641	3803	3963	4123	4281	4438	4594	4748	4901
22	3480	3643	3805	3966	4126	4284	4441	4597	4751	4904
23	3483	3646	3808	3969	4128	4287	4444	4599	4754	4906
24	3486	3649	3811	3971	4131	4289	4446	4602	4756	4909
25	3488	3651	3813	3974	4134	4292	4449	4604	4759	4911
26	3491	3654	3816	3977	4136	4295	4451	4607	4761	4914
27	3494	3657	3819	3979	4139	4297	4454	4610	4764	4916
28	3497	3660	3821	3982	4142	4300	4457	4612	4766	4919
29	3499	3662	3824	3985	4144	4302	4459	4615	4769	4921
30	3502	3665	3827	3987	4147	4305	4462	4617	4771	4924

A Table of Sines.

The Degrees of the Quadrant.

M.	20	21	22	23	24	25	26	27	28	29
31	3505	3668	3829	3990	4149	4308	4464	4620	4774	4927
32	3507	3670	3832	3993	4152	4310	4467	4623	4777	4929
33	3510	3673	3835	3995	4155	4313	4470	4625	4779	4932
34	3513	3676	3837	3998	4157	4316	4472	4628	4782	4934
35	3516	3679	3840	4001	4160	4318	4475	4630	4784	4937
36	3518	3681	3843	4003	4163	4321	4478	4633	4787	4939
37	3521	3684	3846	4006	4165	4324	4480	4635	4789	4942
38	3524	3687	3848	4009	4168	4326	4483	4638	4792	4944
39	3527	3689	3851	4011	4171	4329	4485	4641	4794	4947
40	3529	3692	3854	4014	4173	4331	4488	4643	4797	4949
41	3532	3695	3856	4017	4176	4334	4490	4646	4799	4952
42	3535	3697	3859	4019	4178	4336	4493	4648	4802	4954
43	3537	3700	3862	4022	4181	4339	4496	4651	4805	4957
44	3540	3703	3864	4025	4184	4342	4498	4653	4807	4960
45	3543	3706	3867	4028	4186	4344	4501	4656	4810	4962
46	3546	3708	3870	4030	4189	4347	4503	4659	4812	4965
47	3548	3711	3872	4033	4192	4350	4506	4661	4815	4967
48	3551	3714	3875	4035	4194	4352	4509	4664	4817	4970
49	3554	3716	3878	4038	4197	4355	4511	4666	4820	4972
50	3556	3719	3880	4041	4200	4357	4514	4669	4822	4975
51	3559	3722	3883	4043	4202	4360	4516	4671	4825	4977
52	3562	3724	3886	4046	4205	4363	4519	4674	4828	4980
53	3565	3727	3888	4049	4208	4365	4522	4677	4830	4982
54	3567	3730	3891	4051	4210	4368	4524	4679	4833	4985
55	3570	3732	3894	4054	4213	4371	4527	4682	4835	4987
56	3573	3735	3896	4057	4216	4373	4529	4684	4838	4990
57	3575	3738	3899	4059	4218	4376	4532	4687	4840	4992
58	3578	3741	3902	4062	4221	4378	4535	4689	4843	4995
59	3581	3743	3905	4065	4224	4381	4537	4692	4845	4997
60	3584	3746	3908	4067	4226	4384	4540	4695	4848	5000

A Table of the Sines.

The Degrees of the Quadrant.

M.	30	31	32	33	34	35	36	37
1	5002	5153	5302	5442	5594	5738	5880	6020
2	5005	5155	5304	5451	5597	5740	5882	6023
3	5007	5158	5306	5454	5599	5743	5885	6025
4	5010	5160	5309	5456	5601	5745	5887	6027
5	5012	5163	5311	5458	5604	5748	5890	6030
6	5015	5165	5314	5461	5606	5750	5892	6032
7	5017	5168	5316	5463	5609	5752	5894	6034
8	5020	5170	5319	5466	5611	5755	5896	6037
9	5022	5173	5321	5468	5614	5757	5899	6039
10	5025	5175	5324	5471	5616	5759	5901	6041
11	5027	5178	5326	5473	5618	5762	5904	6044
12	5030	5180	5329	5476	5621	5764	5906	6046
13	5032	5183	5331	5478	5623	5767	5909	6048
14	5035	5185	5334	5480	5625	5769	5911	6051
15	5037	5188	5336	5483	5628	5771	5913	6053
16	5040	5190	5339	5485	5630	5774	5915	6055
17	5042	5193	5341	5488	5633	5776	5918	6057
18	5045	5195	5343	5490	5635	5778	5920	6060
19	5048	5198	5346	5493	5638	5781	5922	6062
20	5050	5200	5348	5495	5644	5783	5925	6064
21	5053	5203	5351	5497	5642	5785	5927	6067
22	5055	5205	5353	5500	5645	5788	5929	6069
23	5058	5208	5356	5502	5647	5790	5932	6071
24	5060	5210	5358	5505	5650	5793	5934	6074
25	5063	5212	5361	5507	5652	5795	5936	6076
26	5065	5215	5363	5509	5654	5797	5939	6078
27	5068	5217	5366	5512	5657	5800	5941	6081
28	5070	5220	5368	5514	5659	5802	5943	6083
29	5073	5222	5370	5517	5662	5805	5946	6085
30	5075	5225	5373	5519	5664	5807	5948	6088

A Table of the Sines.

The Degrees of the Quadrant.

M.	30	31	32	33	34	35	36	37
31	5078	5227	5375	5522	5666	5809	5950	6090
32	5080	5230	5378	5524	5669	5812	5953	6092
33	5083	5232	5380	5527	5671	5814	5955	6094
34	5085	5235	5383	5529	5674	5816	5957	6097
35	5088	5237	5385	5531	5676	5819	5960	6099
36	5090	5240	5388	5534	5678	5821	5962	6101
37	5093	5242	5390	5536	5681	5823	5964	6104
38	5095	5245	5393	5539	5683	5826	5967	6106
39	5098	5247	5395	5541	5685	5828	5969	6108
40	5100	5250	5397	5543	5688	5831	5971	6111
41	5103	5252	5400	5546	5690	5833	5974	6113
42	5105	5255	5402	5548	5693	5835	5976	6115
43	5108	5257	5404	5551	5695	5838	5978	6117
44	5110	5260	5407	5553	5697	5840	5981	6120
45	5113	5262	5410	5556	5700	5842	5983	6122
46	5115	5265	5412	5558	5702	5845	5985	6124
47	5118	5267	5415	5560	5705	5847	5988	6127
48	5120	5269	5417	5563	5707	5849	5990	6129
49	5123	5272	5419	5565	5709	5852	5992	6131
50	5127	5274	5422	5568	5712	5854	5995	6134
51	5128	5277	5424	5570	5714	5856	5997	6136
52	5130	5279	5427	5573	5717	5859	5999	6138
53	5133	5282	5429	5575	5719	5861	6002	6140
54	5135	5284	5432	5577	5721	5864	6004	6143
55	5138	5287	5434	5580	5724	5866	6006	9145
56	5140	4289	5437	5582	5726	5868	6009	6147
57	5143	5292	5439	5585	5729	5871	6011	6149
58	5145	5294	5441	5587	5731	5873	6013	6152
59	5148	5297	5444	5589	5733	5875	6016	6154
60	5150	5299	5446	5592	5736	5878	6018	6156

A Table of Sines.

The Degrees of the Quadrant.

M.	38	39	40	41	42	43	44	45
1	6159	6295	6430	6563	6694	6822	6949	7073
2	6161	6298	6432	6565	6696	6824	6951	7075
3	6163	6300	6434	6567	6698	6826	6953	7077
4	6166	6302	6437	6569	6700	6828	6955	7079
5	6168	6304	6439	6571	6702	6831	6957	7081
6	6170	6307	6441	6574	6704	6833	6959	7083
7	6173	6309	6443	6576	6706	6835	6961	7085
8	6175	6311	6446	6578	6708	6837	6963	7087
9	6177	6313	6448	6580	6711	6839	6965	7089
10	6179	6316	6450	6583	6713	6841	6967	7092
11	6182	6318	6452	6585	6715	6843	6969	7094
12	6184	6320	6454	6587	6717	6845	6972	7096
13	6185	6322	6457	6589	6719	6848	6974	7098
14	6189	6325	6459	6591	6721	6850	6976	7100
15	6191	6327	6461	6593	6724	6852	6978	7102
16	6193	6329	6463	6596	6726	6854	6980	7104
17	6195	6331	6466	6598	6728	6856	6982	7106
18	6198	6334	6469	6600	6730	6858	6984	7108
19	6200	6336	6470	6602	6732	6860	6986	7110
20	6202	6338	6472	6604	6734	6862	6988	7112
21	6205	6340	6474	6606	6736	6864	6990	7114
22	6207	6243	6477	6608	6738	6867	6992	7116
23	6209	6345	6479	6611	6741	6869	6994	7118
24	6211	6347	6481	6613	6743	6871	6997	7120
25	6213	6349	6483	6615	6745	6874	6999	7122
26	6216	6352	6486	6617	6747	6875	7001	7124
27	6218	6354	6488	6619	6749	6877	7004	7126
28	6220	6356	6490	6622	6752	6879	7005	7128
29	6223	6358	6492	6624	6754	6881	7007	7130
30	6225	6461	6494	6626	6756	6883	7009	7132

A Table of the Sines.

The Degrees of the Quadrant.

M.	38	39	40	41	42	43	44	45
31	6227	6363	6497	6628	6758	6886	7011	7134
32	6230	6365	6499	6630	6760	6888	7013	7136
33	6232	6367	6501	6633	6762	6890	7015	7139
34	6234	6370	6503	6635	6764	6892	7017	7141
35	6236	6372	6505	6637	6766	6894	7019	7143
36	6139	6374	6508	6639	6769	6896	7021	7145
37	6241	6376	6510	6641	6771	6898	7023	7147
38	6243	6379	6512	6644	6773	6900	7026	7149
39	6245	6381	6514	6645	6775	6902	7028	7151
40	6248	6383	6516	6648	6777	6905	7030	7153
41	6250	6385	6519	6650	6779	6907	7032	7155
42	6252	6387	6521	6652	6781	6909	7034	7157
43	6255	6390	6523	6654	6783	6911	7036	7159
44	6257	6392	6525	6657	6786	6913	7038	7161
45	6259	6394	6527	6659	6788	6915	7040	7163
46	6261	6396	6530	6661	6790	6917	7042	7165
47	6264	6399	6532	6663	6792	6919	7044	7167
48	6266	6401	6534	6665	6794	6921	7046	7169
49	6268	6403	6536	6667	6796	6923	7048	7171
50	6270	6405	6539	6670	6799	6925	7050	7173
51	6273	6408	6541	6672	6801	6928	7052	7175
52	6275	6410	6543	6674	6803	6930	7054	7177
53	6277	6412	6545	6676	6805	6932	7057	7179
54	6279	6414	6547	6678	6807	6934	7059	7181
55	6282	6417	6550	6680	6809	6936	7061	7183
56	6284	6419	6552	6683	6811	6938	7063	7185
57	6286	6421	6554	6685	6813	6940	7065	7187
58	6289	6423	6556	6687	6816	6942	7067	7189
59	6291	6426	6558	6689	6818	6944	7069	8191
60	6293	6428	6560	6691	6820	6946	7071	7193

A Table of Sines.

The Degrees of the Quadrant.

M.	46	47	48	49	50	51	52	53
1	7195	7315	7433	7549	7662	7773	7882	7988
2	7197	7317	7435	7551	7664	7775	7884	7990
3	7199	7319	7437	7553	7666	7777	7885	7992
4	7201	7321	7439	7555	7668	7779	7887	7993
5	7203	7323	7441	7557	7670	7781	7889	7995
6	7205	7325	7443	7559	7672	7782	7891	7997
7	7207	7327	7445	7560	7673	7784	7893	7998
8	7209	7329	7447	7562	7675	7786	7894	8000
9	7211	7331	7449	7564	7677	7788	7896	8002
10	7213	7333	7451	7566	7679	7790	7898	8004
11	7215	7335	7453	7568	7681	7791	7900	8005
12	7218	7337	7455	7570	7683	7793	7901	8007
13	7220	7339	7457	7572	7685	7795	7903	8009
14	7222	7341	7459	7574	7687	7797	7905	8011
15	7224	7343	7461	7576	7688	7799	7907	8012
16	7226	7345	7463	7577	7690	7801	7909	8014
17	7228	7347	7464	7579	7692	7803	7910	8016
18	7230	7349	7466	7581	7694	7804	7912	8018
19	7232	7351	7468	7583	7696	7806	7914	8019
20	7234	7353	7470	7585	7698	7808	7916	8021
21	7236	7355	7472	7587	7700	7810	7918	8023
22	7238	7357	7474	7589	7701	7811	7919	8025
23	7240	7359	7476	7591	7703	7813	7921	8026
24	7242	7361	7478	7593	7705	7815	7923	8028
25	7244	7363	7480	7595	7707	7817	7925	8030
26	7246	7365	7482	7596	7709	7819	7926	8032
27	7248	7367	7484	7598	7711	7821	7928	8033
28	7250	7369	7486	7600	7712	7822	7930	8035
29	7252	7371	7488	7602	7714	7824	7932	8037
30	7254	7373	7490	7604	7716	7826	7933	8038

A Table of the Sines.

The Degrees of the Quadrant.

M.	46	47	48	49	50	51	52	53
31	7256	7375	7491	7606	7718	7828	7935	8040
32	7258	7377	7493	7608	7720	7830	7937	8042
33	7260	7379	7495	7610	7722	7832	7939	8044
34	7262	7381	7497	7612	7724	7833	7941	8045
35	7264	7382	7499	7614	7725	7835	7942	8047
36	7266	7384	7501	7615	7727	7837	7944	8049
37	7268	7386	7503	7617	7729	7839	7946	8051
38	7270	7388	7505	7619	7731	7840	7948	8052
39	7272	7390	7507	7621	7733	7842	7949	8054
40	7274	7392	7509	7623	7735	7844	7951	8056
41	7276	7394	7511	7625	7737	7846	7953	8058
42	7278	7396	7513	7627	7739	7848	7955	8059
43	7280	7398	7514	7629	7740	7849	7956	8061
44	7282	7400	7516	7630	7742	7851	7958	8063
45	7284	7402	7518	7632	7744	7853	7960	8064
46	7286	7404	7520	7634	7746	7855	7962	8066
47	7288	7406	7522	7636	7748	7857	7963	8068
48	7290	7408	7524	7638	7750	7858	7965	8070
49	7291	7410	7526	7640	7751	7860	7967	8071
50	7294	7412	7528	7642	7753	7862	7969	8073
51	7296	7414	7530	7644	7755	7864	7970	8075
22	7298	7416	7532	7645	7757	7866	7972	8076
53	7300	7418	7534	7647	7759	7867	7974	8078
54	7301	7420	7536	7649	7760	7869	7976	8080
55	7303	7422	7537	7651	7762	7871	7977	8082
56	7305	7424	7539	7653	7764	7873	7979	8083
57	7307	7426	7541	7655	7766	7875	7981	8085
58	7309	7428	7543	7657	7768	7876	7983	8087
59	7311	7439	7545	7658	7770	7878	7985	8088
60	7313	7431	7547	7660	7771	7880	7986	8090

A Table of the Sines.

The Degrees of the Quadrant.

M.	54	55	56	57	58	59	60
1	8092	819	8292	8388	8482	8573	8662
2	8094	8195	8294	8390	8483	8575	8663
3	8095	8197	8295	8391	8485	8576	8665
4	8097	8198	8297	8393	8487	8578	8666
5	8099	8200	8298	8395	8489	8579	8668
6	8100	8201	8300	8396	8490	8581	8669
7	8102	8203	8302	8398	8491	8582	8670
8	8104	8205	8303	8399	8493	8584	8672
9	8105	8206	8305	8401	8494	8585	8673
10	8107	8208	8307	8402	8496	8587	8675
11	8109	8210	8308	8404	8497	8588	8676
12	8111	8212	8310	8406	8499	8590	8678
13	8112	8213	8311	8407	8500	8591	8679
14	8114	8215	8313	8409	8502	8593	8681
15	8116	8216	8315	8410	8503	8594	8682
16	8117	8218	8316	8412	8504	8596	8684
17	8119	8220	8318	8414	8506	8597	8685
18	8121	8221	8319	8415	8507	8599	8687
19	8122	8223	8321	8417	8509	8600	8688
20	8124	8225	8323	8418	8511	8602	8690
21	8126	8226	8324	8420	8513	8603	8691
22	8128	8228	8326	8421	8514	8605	8692
23	8129	8230	8328	8423	8516	8606	8694
24	8131	8231	8329	8424	8517	8607	8695
25	8133	8233	8331	8426	8519	8608	8697
26	8134	8235	8332	8428	8520	8610	8698
27	8136	8236	8334	8429	8522	8612	8699
28	8138	8238	8336	8431	8523	8613	8701
29	8139	8240	8337	8432	8525	8615	8702
30	8141	8241	8339	8434	8526	8616	8704

A Table of the Sines.

The Degrees of the Quadrant

M.	54	55	56	57	58	59	60
31	8143	8243	8340	8435	8521	8618	8705
32	8144	8245	8342	8437	8529	8619	8706
33	8146	8246	8344	8438	8531	8621	8708
34	8148	8248	8346	8440	8532	8622	8709
35	8149	8249	8347	8442	8535	8623	8711
36	8151	8251	8348	8443	8536	8627	8712
37	8153	8253	8350	8445	8537	8628	8713
38	8155	8254	8352	8446	8539	8629	8715
39	8156	8256	8353	8448	8540	8630	8716
40	8158	8257	8355	8449	8542	8631	8718
41	8160	8259	8356	8451	8543	8633	8719
42	8161	8261	8358	8452	8545	8634	8721
43	8163	8263	8360	8454	8546	8636	8722
44	8165	8264	8361	8455	8548	8637	8724
45	2166	8266	8363	8457	8549	8638	8725
46	8168	8267	8364	8458	2551	8640	8726
47	8170	8269	8366	8460	8552	8641	8728
48	8171	8271	8367	8462	8554	8643	8729
49	8172	8272	8369	8463	8555	8644	8731
50	8174	8274	8371	8465	8557	8646	8732
51	8176	8276	8372	8466	8558	8647	8733
52	8178	8277	8374	8468	8560	8649	8735
53	8180	8279	8375	8470	8561	8650	8736
54	8181	8281	8377	8471	8563	8653	8738
55	8183	8282	8379	9473	8564	8654	8739
56	8185	8284	8380	8474	8566	8655	8740
57	8186	8285	8382	8476	8567	8656	8742
58	8188	8287	8383	8477	8568	8657	8743
59	8190	8289	8385	8479	8569	8659	8745
60	8191	8290	8387	8480	8570	8660	8746

A Table of Sines.

The Degrees of the Quadrant.

M	61	62	63	64	65	66	67
2	8749	8832	8913	8990	9065	9138	9207
4	8752	8835	8915	8993	9068	9140	9209
6	8755	8838	8918	8995	9070	9142	9212
8	8758	8841	8921	8998	9073	9145	9214
10	8760	8843	8923	9000	9075	9147	9216
12	8763	8846	8926	9003	9078	9149	9218
14	8766	8849	8928	9006	9080	9152	9221
16	8769	8852	8931	9008	9083	9154	9223
18	8771	8854	8934	9011	9085	9156	9225
20	8774	8857	8936	9013	9087	9159	9228
22	8777	8867	8939	9016	9090	9161	9230
24	8780	8862	8941	9018	9092	9164	9232
26	8783	8865	8944	9021	9095	9166	9234
28	8785	8867	8947	9023	9097	9168	9236
30	8788	8870	8949	9026	9100	9171	9239
32	8791	8873	8952	9028	9102	9173	9241
34	8794	8875	8954	9031	9104	9175	9243
36	8796	8878	8957	9033	9107	9177	9245
38	8799	8880	8960	9036	9109	9180	9247
40	8802	8883	8962	9038	9112	9182	9250
42	8805	8886	8965	9041	9114	9184	9252
44	8808	8889	8967	9043	9116	9187	9254
46	8810	8891	8970	9046	9119	9189	9256
48	8813	8894	8972	9048	9121	9191	9259
50	8816	8897	8975	9051	9123	9194	9261
52	8819	8899	8978	9054	9126	9196	9263
54	8821	8902	8980	9056	9128	9198	9265
56	8824	8905	8983	9058	9131	9200	9267
58	8827	8907	8985	9061	9133	9203	9270
60	8830	8910	8988	9063	9135	9205	9272

A Table of Sines.

The Degrees of the Quadrant.

M.	68	69	70	71	72	73	74
2	9274	9338	9399	9457	9512	9565	9614
4	9276	9340	9401	9459	9514	9566	9616
6	9278	9342	9403	9461	9516	9568	9617
8	9280	9344	9405	9463	9518	9570	9619
10	9283	9346	9407	9465	9519	9571	9620
12	9285	9348	9409	9466	9521	9573	9622
14	9287	9351	9411	9468	9523	9575	9624
16	9289	9352	9413	9470	9525	9576	9625
18	9291	9354	9415	9472	9527	9578	9627
20	9293	9356	9417	9474	9528	9580	9628
22	9296	9358	9419	9476	9530	9581	9630
24	9298	9360	9420	9478	9532	9583	9632
26	9300	9363	9422	9480	9534	9585	9633
28	9302	9365	9424	9481	9535	9586	9635
30	9304	9367	9426	9483	9537	9588	9636
32	9306	9369	9428	9485	9539	9590	9638
34	9308	9371	9430	9487	9540	9591	9639
36	9310	9373	9432	9489	9542	9593	9641
38	9313	9375	9434	9491	9544	9595	9642
40	9315	9377	9436	9492	9546	9596	9644
42	9317	9379	9438	9494	9548	9598	9645
44	9319	9381	9440	9496	9549	9600	9647
46	9321	9383	9442	9498	9551	9601	9648
48	9323	9385	9444	9500	9553	9603	9650
50	9325	9387	9446	9501	9554	9604	9651
52	9327	9389	9447	9503	9556	9606	9653
54	9329	9391	9449	9505	9558	9608	9655
56	9332	9393	9451	9507	9559	9609	9656
58	9334	9395	9453	9509	9561	9611	9658
60	9336	9397	9455	9510	9563	9613	9659

A Table of the Sines.

The Degrees of the Quadrant.

M.	75	76	77	78	79	80	81	82
5	9663	9706	9747	9784	9819	9850	9879	9905
10	9667	9710	9750	9787	9822	9853	9881	9907
15	9670	9713	9753	9790	9824	9855	9884	9909
20	9674	9717	9756	9793	9827	9858	9886	9911
25	9678	9720	9760	9796	9830	9860	9888	9912
30	9681	9724	9763	9799	9832	9863	9890	9914
35	9685	9727	9766	9802	9835	9865	9892	9916
40	9689	9730	9769	9805	9838	9868	9894	9918
45	9692	9734	9772	9808	9840	9870	9896	9920
50	9696	9737	9775	9811	9843	9872	9898	9922
55	9699	9740	9778	9813	9846	9874	9900	9924
60	9703	9744	9781	9816	9848	9877	9903	9925

The Degrees of the Quadrant.

M.	83	84	85	86	87	88	89
5	9927	9947	9963	9977	9987	9994	9998
10	9929	9948	9964	9978	9988	9995	9998
15	9931	9950	9965	9978	9988	9995	9998
20	9932	9951	9967	9979	9989	9996	9999
25	9934	9952	9968	9980	9990	9996	9999
30	9936	9954	9969	9981	9990	9996	9999
35	9937	9955	9970	9982	9991	9997	99
40	9939	9957	9971	9983	9992	9997	99
45	9940	9958	9972	9984	9992	9998	99
50	9942	9959	9973	9984	9993	9998	99
55	9944	9960	9975	9985	9993	9998	99
60	9945	9962	9976	9985	9994	9998	10000

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The Extraction of Rootes.

It is not vnneccessary, befoze we doe enter into the order and method of teaching how to extract a Roote, to shew the diuers kinds and their definitions: Therefoze you must know that of Rootes there are sundry sorts, according to the quantities from which they are deriued, as the Squares, Cubes, Squared Squares, Surdsolides, &c. for the numbers receiue their names of the said quantities, euery quantity hauing his Roote which may be called the first quantity, because it is the bdd or beginning of the quantity wherunto it is set: Numbers of the second quantity are called squares, of the third Cubes, of the fourth squared squares, as befoze: where in you may procede infinitely if you will, but you shall seldeome or neuer haue vse for the extraction of the Roote of any quantity more then Squares and Cubes: A Square number is the product of any number multipliyed in it selfe, and the Roote thereof is the multiplier whereby the same square number is produced: As for example, 4. is a square number comming of the multiplication of 2. in it selfe which is the Roote thereof.

A Cubick number is the product of any number multipliyed in to it selfe, and the same product multipliyed againe by the first number: As 2. multipliyed by it selfe is 4. that product multipliyed againe by 2. the first number makes 8. which is a Cubick number, and the Roote thereof is 2.

A Squared square number, is produced of 3. multiplications: first any number by it selfe makes a square number, that product againe by the first roote or multiplier, makes a Cubicke number: and lastly, that product againe by the first number or roote, produceth a squared square number, as 2. multipliyed in it selfe makes 4. a square number, that againe by 2. makes 8. which is a Cubicke number, and then that product againe by 2. produceth 16. which is a squared square number: and the roote thereof is 2. A Surdsolide number is the product of a number multipliyed 4. times by the roote thereof: as 32. is a surdsolide number, the ~~number~~ ^{roote} wherof is 2. for 2. multipliyed in it selfe is 4. that multipliyed againe by 2. is 8. the same product againe by 2. makes 16. and lastly, the same product multipliyed by the first number 2. makes 32. there-

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foze I conclude that 32. is a surdſolide number, and the number 2. whereby the ſaid number is produced, is the ſurdſolide roote to the ſaid number: And thus multiplying the laſt product by the firſt number or roote, you may proceede infinitely, but more then theſe are needleſſe, and as I ſaid befoze, without any great or common uſe.

Now foze the finding of the roote, it muſt be done according to the quantity whereof it taketh Denomination, as whether it be of a Square or Cube, or otherwiſe: which knowne, let vs proceed to the working thereof.

You muſt vnderſtand that the order of extracting the roote of any quantity, is not much vnlike to Diuiſion, differing onely in this, that whereas in Diuiſion the deniſor is knowne, but heere it is to finde: alſo in Diuiſion you alwayes keepe one deniſor, but in this, you muſt change your deniſor at each removing, which is at the finding of euery figure contained in the roote: Now therefore I will lay downe one generall way foze the extraction of the roote of all quantities whatſoeuer, which is done by certaine numbers applyed to each ſeueral quantity: which are theſe: Foze the Square roote in one number required, which is 20. Foze the Cube two numbers which are 300. and 30. Foze the Squared Square three numbers, viz. 4000. 600. and 40.

Thus hauing declared the kindes, numbers, quantities, and order of the extraction of all ſortes of rootes, it followeth that we proceed to the praſtiſe thereof: And firſt to extract the Square roote of any number, you muſt conſider as befoze I haue ſaid, that 20. is the number foze the ſame quantity: Alſo you muſt learne by memory the iuſt ſquare of all the 9. vnities, which if you know not, this Table will ſtand in ſome ſtead: where you ſee that againſt euery of the 9. vnities afozeſaid towards the right hand is the ſquare of that vntie againſt which it doth ſtand: which I knowne, ſet downe the number whereof you would extract the ſquare-root, then vnder the laſt figure at the right hand, put a prick, and then proceeding towards the left hand vnder euery ſecond figure put a prick, that done, draw with your pen a quotient as in diuiſion: Now foze to finde the roote of your giuen number, ſet the greateſt ſquare num-
1
4
9
16
25
36
49
ber

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ber contained in the number over the first prick, that square 8 64
 number take from the number over the said first prick, and 9 81
 set the remainer over it, the roote of which square number put in
 the quotient for the first figure of the roote: that roote multiply by
 20. the number for the square roote: and then looke how often the
 product thereof may be taken from the number over, or to the left
 hand of the second prick, which put in your quotient for the second
 figure of your roote: but this is to be noted for a generall rule, that
 you must take no greater number for your second figure, then that
 the square thereof added with the former product, may be taken
 from the number over the said second prick: and also looke how
 many prickes are vnder your given number, so many figures
 must be in the quotient for the roote of the said number: then ha-
 ving found 2. figures in the quotient, if there be any more prickes,
 multiply the whole number in the quotient by 20. and seeke how
 often the product thereof may be taken from the number over or
 belonging to the next prick, which number, put in the quotient,
 and adding the square thereof to the former product, subtract the
 whole summe from the number over the said prick, and cancelling
 the said number as at each remone you must doe, set the remainer
 over it, and if there be any more prickes vndone, doe as you did
 before, alwayes multiplying the quotient by 20. thereto adding
 the square of the last figure, and the totall summe being substra-
 cted from the last remainer, if there rest nothing, it is a square
 number or else not, which you may proue, if you multiply the root
 by it selfe squarely, for the roote being truely extracted, will pro-
 duce the first given number. But because that examples are ea-
 siest for the vnderstanding, let 104976. be the given number
 whereof I would know the square roote, viz. what number being
 multiplied into it selfe, will produce the foresaid number of
 104976. Therefore first I set downe the said number, and vnder
 the last figure towards the right hand, which in this example is 6.
 I put a prick or point, another vnder the 9. and lastly another vnder
 0. leauing one figure betwixt euery prick: which done and the
 quotient drawne, the given number will stand thus: 104976|
 whereby I see that the roote of the said number must
 consist of 3. figures, because it hath 3. prickes vnder it: then I seeke

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the greatest square number in 10. it being the number belonging to the first prick toward the left hand, that I finde to be 9. which is produced of 3 multiplied squarely, therefore I put 3. in the quotient for the first figure of the roote, and the square thereof being 9. I subtract from 10. the number over the first pricke, and there rests 1. The order of which worke will stand thus: 1
where you see that the figures over the first pricke 104976 | 3
cancelled, there is 3. in the quotient for the first figure of the roote and 1. rests, which with the figures betwixt it and the next pricke, makes 149. for the number of the second pricke. Now for the second figure of the roote, I multiply 3. the roote already found by 20. and the product is 60. that I seeke how often I may take from 149 the number over the second pricke, which I may doe 2. times, for 2. times 60. is 120. whereunto the square of 2. which is 4. being added, makes 124. that subtracted from 149. leaves 25. therefore I put 2. in the quotient for the second figure of the roote, and cancelling the figures over the second pricke, the remainder being put over it, the working thereof will stand in this order: where you see the quotient is 32. for the two first figures of the roote, and the figures of the two first prickes being cancelled, there rests 25. which with the other figures betwixt them and the third and last pricke, makes 2576. for the number over the last pricke: now therefore, to finde the last figure of the roote, I multiply the roote already found, that is to say 32. by 20. and the product thereof is 640. that I seeke how oft it may be taken out of 2576. the number over the last pricke, which may be done 4. times, for 4. times 640. is 2560. whereunto if I adde the square of 4. there will amount 2576. which because it may be taken from the number remaining over the last pricke, I put 4. in the quotient for the last figure of the roote, and subtracting the former product of 2576. from the number over the last pricke, which is likewise

$$\begin{array}{r}
 104976 \overline{) 3} \\
 \underline{9} \\
 149 \\
 \underline{120} \\
 29 \\
 \underline{20} \\
 97 \\
 \underline{80} \\
 176 \\
 \underline{160} \\
 16 \\
 \underline{12} \\
 4
 \end{array}$$

32

$$\begin{array}{r}
 104976 \overline{) 324} \\
 \underline{9} \\
 149 \\
 \underline{120} \\
 29 \\
 \underline{20} \\
 97 \\
 \underline{80} \\
 176 \\
 \underline{160} \\
 16 \\
 \underline{12} \\
 4
 \end{array}$$

324

2576. there

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2576. there will rest nothing, therefore I cancell these figures likewise, and thereby conclude 104976. to be a square number, and 324. to be the roote thereof: the p^{ro}of whereof is by multiplying the roote into it selfe squarely: so, if you multiply 324. by 324. the first giuen number of 104976. will be produced, the working thereof will be as aboue you may see.

$$\begin{array}{r}
 640 \\
 4 \\
 \hline
 2560 \\
 16 \\
 \hline
 2576 \\
 \hline
 324 \\
 324 \\
 \hline
 1296 \\
 648 \\
 972 \\
 \hline
 104976
 \end{array}$$

This example in my minde, might be sufficient with often vse and practise to bring perfection in this kinde of Extractions, because that although the summe be neuer so great, it is done all by one manner of worke: yet neuerthelesse, if I did not thinke that thou wouldest complaine rather of tediousnes of learning, then of the difficulty in teaching, I would give another example: for variety of examples makes the worke seeme the more easie, Therefore once againe: let 548730625. be a giuen number, whereof I would know the square roote, first I put prickes or points vnder the giuen number in such order as you see, beginning at the last figure towards the right hand, and proceeding towards the left, leauing one figure vnpointed betwixt euery prick, where you see that the whole giuen number consists of 5. prickes, therefore of so many figures must your roote or quotient be: then drawing a quotient, I seeke the greatest square number in 5. which is the number ouer the first prick, which greatest square number I finde to be 4. and the roote thereof 2. so, two times 2. is foure, therefore I put 2. in the quotient, and taking 4. the square thereof from 5. the number ouer the first prick, there will rest 1. which I set ouer 5. cancelling the said 5. the working whereof will stand as a- 1

gainst: then for the second figure of the 548730625 | 2
roote I multiply 2. the first figure of the 4
roote already found by 20. and the product is 40. that I seeke how often may be taken from 148. the number remaining ouer the second prick, which may be done 3. times, so, 3. times 40. is 120. whereunto the square of 3. being

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added makes 129. then I put 3. in the quotient for the second fi-
 gure of the roote, and subtracting 129. the last product from 148.
 the number remaining over the second prick, there will rest 19. which with
 the other figures betwixt them and the next prick, makes 1973. therefore I can-
 sell the 148. and setting the remainder over it, I have 1973. for the number over the 3. prick, and 23. in
 the quotient for the 2. first figures of the root: now for the third fi-
 gure of the root: I multiply 23. the root already found by 20. the
 product is 460. which may be taken from 1973. the number re-
 maining over the third prick 4. times for 460. multiplied by 4.
 makes 1840. whereunto adding 16. the square of 4. the product is
 1856. therefore I put 4. in y quotient for the third figure of the root,
 & subtracting 1856. from 1973. the number over the third prick,
 there will remaine 117. which with the other figures betwixt them and the next
 prick, makes 11706. for the number over the fourth prick, and there is in the
 quotient 234. for the root already found, the whole worke standing, as above: A.
 I multiply 234. the root found, by 20. the product whereof
 is 4680. which may be taken out of 11706. two times, for 4680.
 multiplied by 2. makes 9360. which with 4. the square of 2. makes
 in all 9364. the same being subtracted from 11706. the number
 remaining over the fourth prick, there will rest 2342. which
 with the other figure betwixt them and the fifth or last prick;
 makes 234225. for the number remaining over the last prick,
 therefore making my subtraction, I set the remainder over it, and
 put 2. in the quotient for the fourth fi-
 gure of the roote as you may see in the
 margin: then to finde the last figure of
 the roote of this given number aforesaid,
 I multiply the whole roote already
 found, viz. 2842. by 20. the product is
 16840. which may be taken from

$$\begin{array}{r} 548730625 \\ \underline{123} \end{array}$$

$$\begin{array}{r} 4 \\ \times 29 \end{array}$$

$$\begin{array}{r} 1 \\ \times 17 \end{array}$$

$$\begin{array}{r} 548730625 \\ \underline{1234} \end{array}$$

$$\begin{array}{r} 4 \\ \times 29 \end{array}$$

$$\begin{array}{r} 1856 \end{array}$$

$$\begin{array}{r} 223 \end{array}$$

$$\begin{array}{r} 1742 \end{array}$$

$$\begin{array}{r} 548730625 \\ \underline{2342} \end{array}$$

$$\begin{array}{r} 4 \end{array}$$

$$\begin{array}{r} 129 \end{array}$$

$$\begin{array}{r} 1856 \end{array}$$

$$\begin{array}{r} 9364 \end{array}$$

234225. the

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234225. the number ouer the last prickes. times, for 46840. multiplied by 5. makes 234200. whereunto if I adde 25. the square of 5. the whole product will be 234225. which number is equall to the number ouer the last prick, therefore I put 5. in the quotient, for the last figure of the roote, and subtracting the whole summe of the last product viz. 234225. from the number ouer the last point or prick, which is likewise 234225. there will remaine nothing; whereby I finde 548730625. the giuen number to be a square number, and the roote thereof to bee 23425. which is the number found out in the quotient, as in the working thereof you may more plainly perceiue.

For prooffe whereof, if you multiply 23425. the roote squarely into it selfe, the product thereof will be equall to the first giuen number.

I doubt not, but to any indifferent conceit these two examples will suffice as well as if I should contriue a whole volume thereof, when it is so that the giuen number is a right square number, but if the giuen number be not a square number, it is vnpossible for to finde an exact roote thereto, but that after the worke there will remaine something as a fraction or part of a number more to be added to the quotient: for the true and perfect valuation of which fraction or remainer, none as yet could attaine, but they haue set downe so nere a way for the extraction of the roote of any number not being a square number, that thereby no great error may be perceived: For the knowledge and better vnderstanding of which, let this be a familiar example: you know that 16. is a right square number, and the square roote thereof is 4. but if you would extract the square roote of 18. you should haue 4. in your quotient likewise for the roote thereof, but then there will rest 2. whereby you see that 18. is no square number, neither can you know what fraction to make of it, by reason that you haue no certaine deuisor, which might stand for Denominator to the Numerator or remainer: onely let this suffice, that to finde the nearest roote thereof, the rule is thus: double the remainer for the Numerator and quaduple; viz. multiply the roote by 4. and thereto adde 1. for the Denominator to the said Numerator, as in this example to extract the nearest square roote of 18. I finde 4. to bee

$$\begin{array}{r} 18 \overline{) 47} \\ 16 \end{array}$$

24. being in

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added makes 129. then I put 3. in the quotient for the second fi-
 gure of the roote, and subtracting 129. the last product from 148.
 the number remaining over the second 119
 prick, there will rest 19. which with 548730625 | 23
 the other figures betwixt them and the 4
 next prick, makes 1973. therefore I can- 129
 sell the 148. and setting the remainder
 over it, I have 1973. for the number over the 3. prick, and 23. in
 the quotient for the 2. first figures of the root: now for the third fi-
 gure of the root: I multiply 23. the root already found by 20. the
 product is 460. which may be taken from 1973. the number re-
 maining over the third prick 4. times for 460. multiplied by 4.
 makes 1840. whereunto adding 16. the square of 4. the product is
 1856. therefore I put 4. in y quotient for the third figure of the root,
 & subtracting 1856. from 1973. the number over the third prick,
 there will remaine 117. which with the 1
 other figures betwixt them and the next 11917
 prick, makes 11706. for the number 548730625 | 234
 over the fourth prick, and there is in the 4
 quotient 234. for the root already found, 129
 the whole worke standing as above: A. 1856
 gaine for to finde the fourth figure of the
 root, I multiply 234. the root found, by 20. the product whereof
 is 4680. which may be taken out of 11706. two times, for 4680.
 multiplied by 2. makes 9360. which with 4. the square of 2. makes
 in all 9364. the same being subtracted from 11706. the number
 remainining over the fourth prick, there will rest 2342. which
 with the other figure betwixt them and the fifth or last prick;
 makes 234225. for the number remaining over the last prick,
 therefore making my subtraction, I set the remainder over it, and
 put 2. in the quotient for the fourth fi- 123
 gure of the roote as you may see in the 1191742
 margin: then to finde the last figure of 548730625 | 2342
 the roote of this given number aforesaid, 4
 I multiply the whole roote already 129
 found, viz. 2842. by 20. the product is 1856
 16840. which may be taken from 9364
234225. the

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234225. the number ouer the last prick 5. times, for 46840. multiplied by 5. makes 234200. whereunto if I adde 25. the square of 5. the whole product will be 234225. which number is equall to the number ouer the last prick, therefore I put 5. in the quotient, for the last figure of the roote, and subtracting the whole summe of the last product viz. 234225. from the number ouer the last point or prick, which is likewise 234225. there will remaine nothing; whereby I finde 548730625. the giuen number to be a square number, and the roote thereof to bee 23425. which is the number found out in the quotient, as in the working thereof you may more plainely perceiue.

For prooof whereof, if you multiply 23425. the root squarely into it selfe, the product thereof will be equall to the first giuen number.

I doubt not, but to any indifferent conceit these two examples will suffice as well as if I should contriue a whole volume thereof, when it is so that the giuen number is a right square number, but if the giuen number be not a square number, it is vnpossible for to finde an exact roote thereto, but that after the worke there will remaine something as a fraction or part of a number more to be added to the quotient: for the true and perfect valuation of which fraction or remainder, none as yet could attaine, but they haue set downe so neere a way for the extraction of the roote of any number not being a square number, that thereby no great error may be perceived: For the knowledge and better vnderstanding of which, let this be a familiar example: you know that 16. is a right square number, and the square roote thereof is 4. but if you would extract the square roote of 18. you should haue 4. in your quotient likewise for the roote thereof, but then there will rest 2. whereby you see that 18. is no square number, neither can you know what fraction to make of it, by reason that you haue no certaine deuisor, which might stand for Denominator to the Numerator or remainder: onely let this suffice, that to finde the nearest roote thereof, the rule is thus: double the remainder for the Numerator and quadruple; viz. multiply the roote by 4. and thereto adde 1. for the Denominator to the said Numerator, as in this example to extract the nearest square roote of 18. I finde 4. to bee

$$\begin{array}{r} 18 \overline{) 417} \\ 16 \end{array}$$

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In the quotient, and 2. remaining, which 2. being doubled makes 4. for the Numerator, and 4. the roote being multiplied by 4. makes 16. and 1. added therewith, makes 17. for Denominator, whereby I say that $4\frac{4}{7}$. is the nearest square roote of 18. which may be found out, for if you reduce $4\frac{4}{7}$. into one common Denomination, and then multiply them squarely, the product will be $17\frac{1}{7}$. which is but $\frac{1}{7}$. too little.

Thus having declared the order how to extract the square roote of any number: It resteth now that I shew the manner of extracting the Cube roote of any number: as for the principall uses thereof, you shall finde in the generall practise of the Mathematickes.

To finde out the Cube roote of any given number, being a right Cube number, first put downe the given number, and as in the square number you put points or prickes, beginning at the right hand and so towards the left, leauing betwixt each point one figure voyde, so in the extraction of the roote of a Cube number, you must leaue two figures void or vnprickt betwixt euery point, and as in the square roote, so likewise in this: looke how many points are vnder the given number, so many figures must be contained in the roote thereof, which is also to bee obserued in extracting the roote of any quantity whatsoever: these things being considered, it is also necessary, that you know the greatest Cubicke number of euery of the 9. vnities, whereof the Table here vnder specified maketh explanation: where you see that against each vnty, standeth the Cube number thereof, which

being knowne, and the given number prickt,	1	1
with a quotient drawne as befoze I haue shew,	2	8
ed: to extract the Cube roote, you haue 2. num-	3	27
bers, viz. 300. and 30. but because the working	4	64
therof would be too long to expresse in tearmes,	5	125
let 13824. be a given number, whereof I	6	216
would extract the Cube roote.	7	343
	8	512
	9	729

First I put down that number aforesaid, with pointes vnder it, and a quotient in this order, 13824. Whereby I see that the roote thereof must consist of two figures, because so many pointes doe belong vnto the given number: for the first figure whereof I seek the

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the greatest Cube number contained in 13. the number over the first point towards the left hand, which I finde to be 8. the Cube roote thereof, which is 2. I put in the quotient for the first figure of the roote, and subtracting 8. from 13. rests 5. which I put over 13. cancelling the said 13. which done, the worke will be as below.

Now for to finde the second figure of the roote, I set downe the 2. numbers which serveth for the extraction of the Cube roote, viz. 300. 30. and against 30. I put the roote already found, which is 2. and against 300. the square thereof which is 4. these two figures I set towards the left hand of them, then I multiply 300. by 4. the figure which standeth against it, and the product is 1200. that I seeke how often I may take from 5824. the number over the second pricke, which I may doe foure times, therefore I put 4. in the quotient for the second figure, and upon the right hand against 300. I set 4. the last found number in the quotient, and against 30. I put 16. the square thereof: and underneath 30. I put 64. which is the Cube of 4. then multiplying all the figures which are in a row into one product viz. 4. by 300. makes 1200. and that againe by 4. makes 4800. for that product: then for the next, 2. by 30. makes 60. and that by 16. makes 960. for the second product, which I set downe together each under other. Lastly, because 64. hath no other number to be multiplied therewith, I put that downe under them, which done, I adde them all together, & the totall summe is 5824. the same subtracted from the number over the last pricke, leaveth nothing, whereby I see that 13824. is a Cubick number, and the Cube roote thereof is 24. as you may more plainly see by the working thereof, which is

$ \begin{array}{r} 5 \\ 13 \overline{) 824} \quad 2 \\ \underline{8} \\ 4 \\ 2 \\ \hline 60 \\ 16 \\ \hline 360 \\ 60 \\ \hline 960 \\ 64 \\ \hline 5824 \end{array} $	$ \begin{array}{r} 300 \\ 4 \\ \hline 1200 \\ 4 \\ \hline 4800 \\ 960 \\ 64 \\ \hline 5824 \end{array} $
--	--

24. being

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24. being multtplied into it selfe, & that pro-
duct againe by 24. the first multiplier, the
product is 13824. which is equall to the first
giuen number.

Againe, seeing that examples are the easiest
method of teaching, and plainest for vnder-
standing: let 12551868224. be a giuen
number: whereof I would extract the Cube
roote: First having prickt and drawne a quo-
tient for the roote thus 12551868224. I see
that the roote must consist of 4. figures. so
many prickes being vnder the giuen number.
For the finding of which figures, I seeke first
the greatest Cube number, in 12. which is 8.
y^e roote wherof being 2. I put in the quotient,
for the first figure of the roote subtracting 8. 4

the Cube thereof, from 12. the number ouer
the first pricke, rests 4. then for the second fi-
gure of the roote, I put downe 300. and 30.
the numbers for the Cube roote, against 30. I set 2.

the roote found: and against 300. 4. the Square
thereof: and multiplying 300. by 4. the Product
is 1200. that may be taken out of 4551. the num-
ber ouer the second pricke 3. times, therefore I put 3. in the quo-
tient, and likewise after 300. and the square thereof which is 9. af-
ter 30. and the Cube thereof which is 27. I put vnder 30. then I
multiply all the numbers in the first rowe, each by the other, viz. 4.
by 300. makes 1200. and the same Product againe by 3. makes
3600. which I set by it selfe: Then againe I multiply 2. by 30. is
60. and that againe by 9. makes 540. which I put vnder the other
Product; Lastly, because 27. hath no number wherewith
to be multiplied, I set downe likewise vnder both the other,
and the three numbers being set in order one vnder another,
as you see I adde them all together, and the whole product is 467.
the same I subtract from 4551. the number ouer the next
prick, 4167. and there will remaine 384. to ioyne with the num-
ber

$$\begin{array}{r}
 5824 \qquad 24 \\
 \underline{24} \\
 96 \\
 \underline{48} \\
 576 \\
 \underline{576} \\
 24 \\
 \underline{24} \\
 2304 \\
 \underline{1752} \\
 13824
 \end{array}$$

$$\begin{array}{r}
 12551868224 \quad 23 \\
 \underline{8}
 \end{array}$$

$$\begin{array}{r}
 4 \quad 300 \quad 3 \\
 2 \quad 30 \quad 9 \\
 \underline{27}
 \end{array}$$

$$\begin{array}{r}
 3600 \\
 540 \\
 \underline{27}
 \end{array}$$

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ber ouer the 3. pricke : which done, the worke will stand in this order as you see.

Now for the third figure of the roote, I put downe 300. and 30. as before, & against 30. at the left hand I put 23. the roote already found, and against 300. the square thereof, which is 529. then multiplying 529. by 300. the Product is 158700. which may be twice taken from 384868. therefore I put 2. in the Quotient for the third figure of the roote, and likewise put 2. to the right hand of 300. and the square thereof which is 4. at the right hand of 30. and the Cube thereof being 8. I put vnder 30. which numbers will stand as aboue; then multiplying all the numbers in one rowe each by other, into one Product, viz. 529. by 300. makes 158700. and that againe by 2. is 317400. for the whole product of that rowe, which I set downe by it selfe; then I multiply 23. by 30. is 690. and that againe by 4. is 2760. for the product of the second rowe.

$$\begin{array}{r}
 4384 \\
 1255 \times 868224 \underline{23} \\
 8 \\
 4167 \\
 529 \quad 300 \\
 23 \quad 50
 \end{array}$$

Lastly, because 8. hath no number with it, I put it downe vnder the other, and then adding all the three summes together, the product is 320168. the same taken from 384868. the number ouer the third pricke, rests for the number ouer the last pricke, 64700224. and in the Quotient, is 232. the whole worke being as you see aboue.

$$\begin{array}{r}
 320168 \\
 6 \\
 4384700 \\
 1255 \times 868224 \underline{232} \\
 8 \\
 4167 \\
 320168
 \end{array}$$

Now to finde the fourth and last figure of the root, I put downe the two numbers againe, which serue for the Cube root, viz. 300. and 30. At the left hand of 30. I put 232. the number in the Quotient, and at the left hand of 300. I set the square of 232. which is 53824. in this order: Then multiplying 53824. by the Product, is 16147200. which I seeke how often may be had in 64700224. the numbers remaining ouer the last pricke, that may be done 4. times: Wherefore I put 4. in the Quotient, for the fourth and last figure of the roote, and also I set the said 4. at the right

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right hand of 300. and the square thereof which 53824... 300... 4
 is 16. at the right hand of 30. and the Cube 232... 30... 16
 thereof being 64. I put right underneath 30. 64
 which done, all the numbers will stand as abone: Then multiply-
 ing all the numbers in each rowe, into their severall products, viz.
 53824. by 300. makes 16147200. that againe by 4. is 64588800.
 which I set by it selfe: Then againe 232. by 30. is 6960. the same
 Product by 16. makes 111360. which I put downe under the
 other.

Lastly, because 64. hath no other number to be multiplyed there-
 with, I put it downe likewise, under the other 2. numbers, and
 adding the 3. Products together, the whole summe thereof will be
 64700224. which being subtracted from the number remaining
 over the last prick, leaues nothing: So haue I in the Quotient
 2324. for the Cube roote of 12551868224. the giuen number: the
 whole worke whereof is here set downe in the margine. For the
 proue whereof, if you multiply the roote: viz. 2324. Cubickly in
 it selfe, the Product thereof will bee equall with the first giuen
 number, as for Example you may see in the working.

Where you see, that 2324. the roote being multiplyed into it
 selfe squarely, and then likewise the whole Product thereof againe
 by the same roote, 2324. The totall summe amounting thereof,
 12551868224. is the first giuen number.

But when you haue a number giuen to ex- 12551868224
 tract the Cube roote, and the aforesaid giuen number be not a right
 Cube number, whereby you cannot come to any perfect roote there-
 of, but that there will remaine some fraction or broken number af-
 ter your said extraction, onely the manner to extract the nearest root
 of a number not Cubicall, as most Writers doe affirme, is thus:

The difference betwixt the Cubicke number of the Roote, and
 the Cubicke number of a number more then the roote, by an unity,
 shall be the Denominator to the remainer, 1. added also thereto:

As for Example: Let 12. be a number giuen, which not being
 a right Cube number, I would find the nearest roote thereof: First
 the greatest Cubicke number in 12. is 8. the Cube roote whereof be-
 ing 2. I put in the quotient, and subtracting 8. the Cube thereof
 from

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from 12. there will rest 4. which 4. being ouer, sheweth that 12. is no Cubick number: therefore adding 1. to 4. makes 5. which I put for the Numerator: and to finde the Denominator thereto, I set downe the Cube 2. the Rote found, which is 8. and likewise 27. the Cube of 3. which is a number more then the Rote by 1. then subtracting the one from the other, viz. 8. from 27. leaues 19. for the Denominator: By which reason the nearest Cubick roote of 12. is $\frac{5}{19}$. which being reduced, and multipliyed Cubickly, makes 11. $\frac{125}{6859}$. the same abzeuiated, makes 11. & very neere $\frac{1}{3}$. and it should be 12. therefore the error is $\frac{1}{3}$. too little, which although in this is no great error, yet in a great summe the error would be very much: Therefore for those which desire a more exact and perfect extraction of the Square or Cube roote from numbers not being right Square or Cubick numbers: Master Record in his Wheirstone of wit, setteth downe an exact way (but being tedious) which is thus: For the Square roote, adde to the giuen number so many times 2. Ciphers, as you desire the neerenesse of the Rote: And for the Cubicke roote so many times 3. Ciphers, as you desire the exactnes of the roote thereof: and vnder the said Ciphers, put prickes in such order as before is taught: and then marke how many prickes there is ouer, and besides the prickes of the giuen number: And then extract the roote from all those Ciphers in such order as you did before: for if there be 1. more, the roote shall be tenths, and the remainerr parts of $\frac{1}{10}$. if there be 2. points or prickes ouer, more then the giuen number, then the roote shall be hundredths, and the remainer parts of $\frac{1}{100}$. if 3. prickes be ouer, the roote shall be thousands, and the remainer parts of $\frac{1}{1000}$: and so you may come to a very neete roote, but not to any exact or perfect roote, vlesse the giuen number be a right Square or Cubicall number.

A Declaration of the Tables of Longitude and Latitude of places following.

The Tables hereafter following, shewing the Longit. and Latit of places, viz. of Kingdomes, Prouinces, Cities, Isles, Capes, Bays, Rivers, and Mountaines, especially the most principall of them

The Sea-mans Kalender.

them in the whole world, are gathered from the latest Descriptions, Maps and Charts, as well vniuersall as perticular: who albeit they differ greatly in Longitude, yet in Latitude most of them agree: and also hauing a respect to the beginning of each of their seuerall Longitude, they come all to a neere agreement: For some beginning their Longitude at the Westermost part of Africa, makes the Longitude of London to be about 10. degrees 20. minutes: others beginning at the Canary Islands, makes the Longitude of London 18. degrees: others more Westward make it 19. degrees 30. min. and Iodocus Hondius beginning the Meridian at the Ile Pico, one of the Azores, makes London to be in Longitude 27. degrees 40. minutes: but I following Mr. Emery Molineux, according to his great Globes, doe account the Longitude from the Westermost parts of St. Michaels, another Ile of the Azores, the midst of which Ile is 50. minutes in Longitude, and from the Westermost part thereof, the Longitude of London is 25. degrees 40. minut. which in effect is not much different from any of the others: Note that the Longitude is counted from the Meridian, passing ouer the aforesaid place Easterwards into a continuall progression, to the end of 360. which is the whole Circumference of the world. Latitude is counted from the Equinoctiall to the end of 90. degrees on each side thereof: and where the Letter S is after any number, it shewes the place to haue so many degrees and minutes of South Latitude: all the rest hauing no letter adioyning, haue North Latitude, the whole being set in Alphabeticall order, for the readier finding of any place therein contained: and where the Longitude and Latitude of any Kingdome is set downe, noted by this sillable Reg. it expresseth the middle thereof. Further, at the end of such places as begin with one Letter, is left a space wherein the Traueller may insert such places, whereof the Longitude and Latitude is to him knowne, and not herein exprest.

¶ Table of the Longitude and Latitude of all the
Notable places of the world.

A	Longit.	Latit.	A	Longit.	Latit.
A			Alicoa	7 41	13 21 S
Capulco	276 1	18 1	Alicur	44 21	38 29
Acartij an Il.	329 1	52 1	Alima	108 51	31 1
Azores an Iland	357 1	39 1	Alleluia	70 21	10 1
Achaguas	101 30	5 30 S	Almedina	34 1	33 41
Achin	132 30	4 40	Alpes a mountain	41 29	47 29
Aden	75 12	13 1	Alfigubas	147 11	38 41
Adia	50 11	25 1 S	Amazen	45 29	12 41
Adu	105 41	5 41 S	Amazons Reg.	323 1	13 1
Ægypt	64 3	30 1	Las Amozona	312 29	12 29 S
Africa Reg.	40 1	10 1	Ammon	59 41	27 11
Agonata	162 21	38 1	Amsterdam	33 1	51 29
Agragam	144 29	8 21 S	Auarie a mount	116 0	54 29
Aguada segura	253 29	24 1	Ancona	63 11	1 11
Aquala de pozos	245 20	28 0	Ancona	43 29	43 51
Alina a mountaine	98 41	54 20	Amboina	161 54	3 20
Alacranes	283 5	22 1	Abona	164 30	6 10 S
Alagoa	58 41	29 41 S	Amiona	75 20	12 40 S
Albion noua	235 1	50 0	Andernopoly	58 11	44 41
Albiron	109 29	25 29	S. Andre	170 29	12 1
Alboram	25 29	35 29	S. Andre	22 11	56 21
Albrough	26 25	52 20	S. Andreas	62 11	61 11
Alepo	72 29	38 1	Las a negadas	296 0	50 1 S
Alcada	23 4	40 29	Angier	24 41	47 35
Alexandria	65 1	31 21	Anglesey	19 51	54 0
Alexandria	106 11	36 21	Anglia Reg.	23 0	53 0
Algaziu	16 0	29 1	Angolefine	27 1	46 0
Algieri	33 1	35 21	Antiochia	300 50	6 40
Alguescet	63 41	26 51	Antipara	74 20	25 20 S
Alicante	28 41	39 1	Antwerpen	31 20	50 30

A B	Longit.	Latit.	B	Longit.	Latit.
Arabi atelix	83	0 21 0	Balsera	82 40	31 10
Arabia desert	77	0 30 0	Bamberg	39 15	50 10
Armenia Reg.	76	0 41 0	Bandu	173 30	33 0
Amoltus mount	35	0 11 30 S	Bax de los pergos	345 30	20 0 S
Ascension	353 20	18 50	La Barbada	192 50	1 50 S
La ascension	15 30	8 0 S	Barlingas	16 20	39 30
Afria Reg.	85	0 36 0	Barnagassos Reg.	70	0 13 0
Athens	56 10	40 0	S. Bartholome	194 30	14 0
Aucro	17 30	41 10	Basell	37 10	47 50
Augustine	293	0 29 50	Beciasa	65	0 10 30
Ausburgh	38 40	48 30	Beil	76 15	27 10
Azura a mountain	59	0 22 40	Belef	69	0 51 40
Amiens	28 30	49 40	Belisse	21 40	47 0
B			Belt	52 30	50 0
B Antam	140	0 5 40 S	Bengala Reg.	126	0 26 30
Babilon	82 20	33 0	Benichao	136	0 3 50
Babell mandell	80	0 12 50	Benia Reg.	41	0 7 40
Bachu	88 50	42 0	Bepirus a mount	143	0 34 0
Bactriana Reg.	115	0 38 30	Bepirus a riuier	138 20	34 0
Bagafus a lake	77 10	50 40	Berga	40 10	62 50
Baharam an Ile	87 20	27 30	Bergen	30 30	60 50
Bayes.			Barwicke	22 50	55 50
Bayanegada	319 50	40 20 S	Bethle	38 50	25 40
Bay de baxos ane- gados.	321 30	39 50 S	Baifer Reg.	50	0 4 0
Bianza	149 25	3 0 S	Braligrod.	58 20	47 30
Batauia	123	0 3 10 S	Bilbao	23 30	43 0
Bay a dalagoa	56 10	36 0	Blaskey	12	0 51 40
Bay de fumos	240 20	8 40 S	Blaues	31 10	42 0
Bay de S. Migell	39 30	41 0	Blauet	21 15	47 50
Bay Ocfinora	312 30	37 30	Bloc	5 30	67 0
Bay de plinos	233	0 48 28	Borneo	131 30	5 10
Bay langos	18	0 42 10	Borntholme	40 50	55 30
Bacalaio	335 4	44 0	Bouenberg	34 20	56 30
Bayona	17 20	31 10	Brandenberg	42 30	52 50
Bayone	25 30	50 10	Brasill	5 10	51 20
			Brasilia Reg.	345	0 10 0 S

B	C	Longit.	Latit.	C	Longit.	Latit.
Braua		74 30	0 30	Cap braua	275 1	27 29
Brest		20 0	48 30	Cap de breton	331 1	45 41
Bruage		25 30	45 50	Cap cameron	287 21	25 41
Bruges		29 0	51 10	Cap comerin	115 15	7 30
Buda		48 0	47 20	Cap cantin	17 1	32 11
Burdeaux		26 0	45 10	Cap de S. Catherin	41 1	1 1 S
Brittow		22 50	51 35	Cap de cro	31 29	42 11
Brachipult point in Wales		21 25	53 0	Cap croce	65 21	48 21
Bachapta		31 0	59 50	Cap de fiero	281 21	29 21
Brussels		30 50	51 0	Cap de sperance	324 29	51 1
Barcelona		28 15	41 10	Cap des domingo	315 21	46 41 S
Burlings		16 0	39 38	Cap falso	41 31	34 40 S
C				Cap feare	305 11	32 29
Capes,				Cap felix	84 29	14 11
Cape S. Francis	335 0	48 5		Cap finis Terre	16 1	43 11
Cape Rafo	334 40	46 28		Cap Florida	293 21	25 29
Cape Massilaco	24 0	43 32		Cap formoso	28 1	5 1 S
Cape de las penes	21 0	43 35		Cap froward	302 39	53 21
Cap de Alinde	346 50	1 0		Cap de gato	26 39	36 51 S
Cap del Amber	85 30	12 0 S		Cap de S. Helena	326 11	36 11
Cap de S. Anton	289 15	22 50 S		Cap de santiago	309 1	37 29
Cap Cleare	14 10	51 9		Cap S. Iohn	62 29	67 29
Cap de S. Antoni	74 30	17 0 S		Cap de Krin	13 1	53 41
Cap de S. August	162 0	6 30		Cap de S. Maria	77 29	24 1 S
Cap de S. Augutt.	354 0	8 30 S		Cap de Maio	82 52	15 51 S
Cap baxo	328 0	4 20		Cap de S. Maria	327 11	35 11 S
Cap de las baxas	19 41	15 29		Cap de S. Maria	9 41	21 41
Cap Bedford	320 1	65 29		Cap de la mela	36 51	6 29
Cap blanco	273 19	25 21		Capo de nombre	308 11	53 1
Cap blanco	281 19	10 29 S		de Iesus		
Cap blanco	331 21	4 29		Cap Ortegall	18 29	44 11
Cap blanco	334 21	52 1		Cap de palmas	348 11	1 19 S
Cap blanco	289 41	2 21 S		Cap S. Paul	32 0	5 50
Cap blanco	151 1	22 41		Cap de pescadores	277 40	28 0
				Cap del plate	352 50	5 0 S
				Cap primero	42 30	2 20 S

C	Longit.	Latit.	C	Longit.	Latit.
Cap de 3. pointes	28 30	50 20	Casina a riuier	121 40	61 0
Cap de puntas	315 20	10 40	Castrum portugal	57 10	20 20 S
Cap daguilius	42 15	34 30	Cazan	86 20	56 30
Cap de Razo	334 30	46 20	Chaga	56 0	6 20 S
Cap salida	74 0	26 10 S	Chialo	56 20	7 0 S
Cap de spigiel	353 20	7 20 S	Chilimazata	294 30	6 30 S
Cap de stauola	12 20	54 0	Chio	58 30	40 30
Cap Toriga	11 30	18 20	Chiguifamba	305 30	17 0 S
Cap la vela	305 10	11 50	Coale	65 0	21 30
Cap S. Vincent	302 20	53 40 S	Coila	48 20	3 10 S
Cap de virginMa.	308 0	52 10 S	Cora	85 10	19 20
Cap de vittoria	297 30	52 0 S	Coronades	296 30	45 0 S
Cap passaro	46 29	36 51	Corpo santo	84 10	7 30 S
Cap refalgate	96 21	22 21	Cumana	313 30	7 0
Cap rafo	217 41	8 0	Cusco Reg.	297 20	13 30 S
Cap roxent	16 29	18 51	Cales in Spaine	20 51	36 10
Cap roxo	11 1	12 0	Cambalu	161 11	51 40
Cap of good hope	39 29	34 40 S	Canada	305 11	50 21
Cap del spirito san	161 11	13 11	Canaria	9 29	27 21
Cap S. Vincent	17 0	37 0	Candia	59 29	35 21
Cap Verd	9 51	14 20	Caribes	316 11	7 0
Cap de bona vista	334 21	49 11	Cartagena	300 1	11 20
Cap Walsingham	321 1	63 41	Cartagena	28 21	38 20
Campdn Reg.	136 1	47 0	Cartago	299 29	3 11
Cairo	67 29	30 0	Casena Reg.	38 21	17 11
Calamita	67 41	48 10	Cassar Reg.	132 1	47 1
Caldy	20 1	51 40	Cataio Reg.	150 1	53 1
Calecut	112 41	10 29	Catnes	22 9	58 29
Callice in France	29 10	50 40	Catwicke	41 11	69 11
Calibia Reg.	42 10	36 20	Chester in Englād	21 29	53 51
California	245 0	30 0	Chichester	24 11	51 0
Camanor	300 20	16 30 S	Chidlies cape	326 41	67 29
Cambaba	150 0	8 10 S	Chily Reg.	305 0	30 1 S
Cambaya	102 0	22 28	Chirman Reg.	96 0	26 29
Camboya Reg.	142 20	11 40	Cirena	53 29	32 0
Capiapa	304 50	34 0 S	Cyprus	68 40	37 30

C	D	Longit.	Latit.		D	E	Longit.	Latit.
Clearmont		30	55	45 51	Derwinda		47 51	57 29
Cocasa mountain		79	0	47 29	Deuenter		33 25	51 51
Cochin		114	0	9 14	Diep		28 41	49 29
Collao Reg.		310	0	16 0 S	Dires cape		321 29	64 51
Colmogory		62	41	63 41	Dominica		319 41	14 0
Colne		34	0	51 41	Don a riuier		75 0	53 21
Commania Reg.		86	0	51 0	Donecz a riuier		71 0	51 0
Congu		147	21	49 11	Dorow		58 0	51 29
Coninxberg		49	11	55 29	Douer		28 11	51 0
Constantinople		61	10	44 40	Dublin		16 41	53 11
Copenhage		38	29	55 51	Dumaran		150 0	8 41
Corafau Reg.		108	1	37 0	Duy		34 29	59 21
Corke in Ireland		15	41	51 41	Duyhe		56 29	50 29
Corfu an Iland		22	0	39 29	Dams straights		324 1	64 0
Corinth		54	21	39 0	Darby		24 5	52 55
Corfica		38	11	42 0	Dunkerke		29 10	51 12
Cotum Reg.		230	0	51 0	E			
Cracow		48	29	50 0	E Baida		60 1	25 29
Cuba		296	0	31 41	E Edenbrough		22 1	55 51
Earle of Cumber-		316	0	63 21	Ely		25 20	52 40
lands Iles.					Elior		26 20	10 10
Cusitan Reg.		87	0	32 0	Queen Elizabeths		337 0	61 30
Conough		15	35	53 45	forland.			
Cambridge		25	50	52 14	Emden		34 10	53 10
D					Ens		43 0	48 30
D Angali Reg.		78	0	11 0	Ens		74 10	37 30
Diu		97	3	20 42	Ephesus		60 30	39 40
Damon		98	8	19 20	Ergas		86 0	38 0
Dabul		98	6	17 45	Euboya		56 10	41 0
Dwina		74	30	62 10	Euphrates		76 40	40 0
Dageroort		48	41	59 41	Europa Reg.		55 0	51 0
Dalacia		77	0	14 21	Exeter		22 10	50 0
Damaseus		74	29	33 0	Enchuisen		21 40	52 54
Dantzicke		46	0	55 0	F			
L. Darcies Ile		327	51	68.21	F Alfterhode		40 0	56 0
					F Famagosta		69 20	57 30

F	G	Longit.	Latit.		G	Longit.	Latit.
Farrollones		294 20	11 40 S		Garneley	22 20	49 40
Fargana		114 40	46 0		Gaza	70 50	33 10
Farre		16 20	61 30		Gamba	64 40	17 30 S
Cap fatache		86 50	15 40		Gargiza:	72 40	12 0 S
Falo		75 50	45 40		Gemanacota	118 40	6 0
Farnafa		38 10	30 10		Geneua	33 40	46 20
Fernandobuck		351 40	9 20 S		Genua	37 50	45 0
Fees Reg.		21 50	32 50		Genua	15 20	16 0
Fierro		6 20	26 30		Gerguth Reg.	153 0	57 0
Finmarke		47 0	69 30		Germanarco	40 0	51 0
Flambroughhead		20 54	0		Getseuin	24 30	32 20
Flensburgh		36 40	55 0		Genera	7 30	26 30
Fleccory		32 0	58 0		Ghir a riuier	25 30	22 0
Flye		32 0	53 33		Giamber	18 1	33 41
Florence		41 10	43 40		Gilberts sound	326 51	67 1
Flores Iland		353 40	39 20		Giras a riuier	41 21	20 11
Florida Reg.		292 0	31 0		Galloway	15 49	53 15
Flocen		38 40	46 30		Goa	102 21	15 41
La formanos		310 30	60 40		Glosgow	29 0	57 0
Formentera		31 10	38 50		Golfo de Benngal	125 0	15 0
Forteuentura		11 0	28 0		Golfo de S. Helen	48 41	33.29 S
Foyl		15 50	55 30		Golfo de la India	44 21	34 1 S
Frayles		314 30	11 20		Golfo de los negi	350 30	2 0 S
Franckfort		36 30	50 0		Golfo del Rey	40 41	5 30 S
Frisland		351 30	62 0		Golfo de todos Santos	345 30	1 41
Forbifhers straigh.		331 20	64 0		Golfo de S. Anton	46 20	26 0 S
A furious ouerfall		322 30	60 0		Golfo frio	45 30	20 0 S
Farre Ilands		20 0	62 10		Goteland	45 21	57 30
Farnill Ile		24 45	60 0		Gozo	58 20	34 41
Ferando		146 0	32 35		Granda	318 20	11 0
G					Granata	23 30	38 0
G Ago Reg.		25 0	8 30		Grecia Reg.	54 0	40 0
G Galathia		37 20	37 0		Gratiosa	357 30	39 2
Gambra a riuier		12 0	13 10		Groninghen	32 11	53 0
Gane		30 20	50 40		Groenland	0 0	75 0
Garamantica		51 30	16 0				

G	H	Longit.	Latit.		H	I	Longit.	Latit.
Groy		21	0	47 21		I		
Guinea noua		80	0	5 0	[Ambie		121 30	1 15 S
Guinea Reg.		18	0	9 0 S	Iacatra		123 24	6 0 S
Gunagona		67	30	6 0	Iamaica		238 29	7 1
Gibraltar straights		21	30	35 2	Iasques in Persia		44 0	25 40
	H				Iapan		169	38 0
					Iarsey Iland		23 0	49 20
					Iaua maior		140 0	9 0
					Iaua minor		150 0	6 0
					Iazin		77 30	20 30
					Iapara		141 20	7 40
					Ierico		73 1	33 0
					Ierusalem		72 21	33 0
					Ilmens a riuer		105 0	27 0
					Imaus a moun- taine		128 0	39 0
					India Orientall		135 0	26 0
					Indus a riuer		115 29	26 0
					Inspurg Ilands		40 41	47 50
					The three Ilands		169 21	40 9
					Ile d'cauēs		310 30	11 20
					Ile de cauēs		173 50	4 30
					Ile de bastinado		293 30	10 30
					Ile braua		1 20	12 20
					Islas de corales		194 40	9 50
					Ile desierto		178 0	31 1
					Ile del fuego		22	14 21
					Ile de los fuegos		181 29	22 41
					Ile de los Galope- gos maiores		281 10	4 0
					Ile de los Galope- gos menores		277 30	1 10 S
					Ile de Homabres blancos		169 20	5 41
					Ile de S. Iago		158 20	8 1
					Ile de S. Iuan		325 29	42 30

I	Longit.	Latit.	I	K	L	Longit.	Latit.
<i>Ile</i> de los Ladrones	177 21	15 11	Itabella			305 21	18 51
<i>Ile</i> de los Lobos	307 41	40 21	Iland			8 0	66 C
<i>Ile</i> de S. Maria	296 29	37 2 S	Italy Reg.			42 29	43 0
<i>Ile</i> de martin vaz	10 41	21 1	Ireland			16 0	53 29
<i>Ile</i> de May	4 29	13 29	Iucatan Reg.			28 30	18 0
<i>Ile</i> S. Michael	0 0	29 29	Iugor			138 0	7 50
<i>Ile</i> de Negros	155 29	10 29	Iuica			31 21	39 30
<i>Iland</i> of Fowles	33 40	50 0	Iulibella			61 0	1 30
<i>Ile</i> de Orleance	31 0	50 29		K			
<i>Ile</i> de Paiaros	314 0	12 41	K Almuchy in			9 5	51 0
<i>Ile</i> de palmas	163 21	6 0	Tartaria				
<i>Ile</i> de Paxaros	198 51	8 51	Karakithath Reg.			119 0	51 0
<i>Ile</i> de Paxaros	234 21	28 0	Cafakky Tartaria			103 0	51 0
<i>Ile</i> de Pearles	203 11	7 0	Kithais Reg.			110 0	57 0
<i>Ile</i> de Pinos	292 21	21 29	Kithay a Lake			123 31	53 0
<i>Ile</i> de Rees	1 20	25 21	Kola			54 51	69 0
<i>Ile</i> of Salt	411 0	16 29	Kolenig			4 11	65 10
Salomon Iland	204 40	10 0	Kofar a riuier			96 40	49 0
<i>Ile</i> of the Sunne	547 41	10 29	Kintaile			19 39	56 45
<i>Ile</i> S. Thomæ	38 0	0 0	Kinfaile			15 3	52 35
<i>Ile</i> S. Thomas	252 0	20 11		L			
<i>Ile</i> de Verde	353 51	45 29	L Acierna			24 50	39 30
<i>Ile</i> de S. Vincent	175 50	8 0	L Ladena			53 30	41 31
<i>Ile</i> de S. Vincent	73 21	20 29	Ladoga			62 11	61 40
<i>Ile</i> de S. Catalina	334 10	27 30 S	Lago de los coro			295 1	44 0
<i>Ile</i> de Cedros	240 30	29 50 S	nados				
<i>Ile</i> de Farnan. Iaro	354 20	2 20	Lampesa			36 21	33 0
<i>Ile</i> de lima	295 10	22 0 S	Lancarroca			11 41	29 30
<i>Ile</i> fecas	46 20	29 30 S	Lanow			51 11	52 20
<i>Ile</i> de Tristan de	26 30	36 0 S	Laredo			22 51	43 0
Acunia			Larissa			70 0	33 0
Ioam	135 0	7 29	Larta			53 0	46 0
Iolofo Reg.	24 29	6 0	Lake de Gouleme			306 40	48 0
Ipswich	27 12	52 22	Lacus armibus			131 0	60 10
Ioppe	71 21	4 0	Lacus falsus			137 40	47 30

L	M	Longit.	Latit.	M	Longit.	Latit.
Leon		21 11	42 15	Macyra an Iland	62 0	19 40
Leon		283 41	11 21	Madera Ilands	8 11	31 29
Leopolis		52 51	49 2	Mæatis palus	71 30	40 29
Lepin		98 0	58 41	Magadaxo	78 0	5 11
Leguio maior		165 0	28 0	Magalo	71 20	9 29 S
Leguio minor		158 41	22 0	Maida	2 40	46 40
Lerida		28 21	41 30	Magallanes	305 0	53 25
Lester point		335 0	62 0	straights		
Lima		296 41	23 30	Majorca Iland	39 31	33 9
Limonia		72 11	44 20	Malibrigo	178 51	26 0
Limosa		43 29	4 50	Malaca	122 30	25 1
Lyons		32 41	45 40	Malaga	23 51	37 21
Lyorne		40 21	43 30	Maldanar an Iland	113 0	3 0
Lisboa		17 29	39 11	Malorca	39 51	32 51
Lyzard		18 30	50 10	Malta Iland	46 0	35 31
London		25 50	51 40	Man an Iland	19 0	54 51 S
London coast		326 11	72 0	Mofambiqua	61 25	14 32
Lepeso		74 1	49 41	Mogada	66 34	4 0
Loyre a riuer		24 14	47 41	Mamora	135 0	0 30 S
Longfouand		34 30	58 55	Membafa	78 15	3 20
Lubecke		38 2	53 51	Mangesia	61 91	41 29
Lucka		42 11	52 0	Mangiorcha	150 0	37 0
Luky		64 0	58 21	Manica	62 51	23 29 S
L. Lumleys Inlet		320 0	61 0	Manicongo Reg.	46 41	5 0 S
Luna a mountaine		60 0	16 0	Maniola Iland	140 30	2 0
Lundy		19 2	51 0	Marchant Ile	32 0	68 21
Lutzke		54 0	50 21	Mare de bachuor	92 0	45 0
Lufon an Iland		156 0	17 0	the caspium sea.		
Lybia		33 0	23 30	Mare congelatum	345 0	64 0
Lin		29 25	52 48	Mare de India	120 0	10 0
Lincolne		25 25	53 22	Mare major	68 0	46 0
M				Mare mediterani-	59 0	35 0
M Ahoga		64 41	83 30 S	um		
M Machian		105 41	0 29	Mare rubrum	75 0	20 0
Machonta		93 51	33 51	Mare vermeyo	255 0	36 0
Macfin Iland		93 30	75 30	Mare delzur	220 10	10 0

M	Longit.	Latit.	M N	Longit.	Latit.
Margarita	314 11	0 50	Memorancie	130 0	47 0
Marigalante	320 0	13 50	Mongull Reg.	160 0	61 30
Marnios	306 21	40 40	Monte de brand	47 11	30 15 S
Marrocco	20 0	30 29	Mont frogoso	44 0	12 0
Marcellis	33 51	13 40	Mont negro	44 41	17 0
Mafalio	23 29	30 20	Mont raleigh	20 20	65 0
Milford hauen	20 5	51 48	Mont royall	301 0	45 40
Maftagan	302 1	35 2	Morea Reg.	54 30	38 0
Mazaker	167 0	33 0	Mosaik	68 50	55 0
Madagascar	7 0	19 5	Mofambique Reg.	70 20	14 40
Mara apana	312 10	8 0	Muscouia Reg.	80 0	59 0
Meander a moun- taine	152 0	31 30	Moskow	70 30	55 40
Maleftreame	6 0	67 22	Moffa	84 30	35 0
Meb	46 29	34 40	Mofull	84 0	34 55
Medina cely	23 29	41 10	Mozena	24 20	34 30
Medina talnaby	73 0	27 20	Moa	96 36	21 31
Manilia	145 0	13 35	Minas	165 0	36 20
Medino	98 29	36 29	Mofeenek	69 50	51 30
Middleburgh	29 40	52 0	Munfter	35 0	52 10
Meiffen	41 0	51 10	N		
Melinde Reg.	71 21	3 20 S	N Abarz	79 50	50 50
Melley Reg.	154 1	12 0	N Naiman Reg	140 0	64 0
Meluing	48 1	54 50	Naynen	31 10	50 0
Ments	35 51	50 0	Nantes	24 10	47 50
Mefhet	85 29	52 50	Napoly	45 0	41 0
Mefopotamia	78 1	35 0	Napoly	55 10	38 0
Meffana	45 51	37 50	Napthaly	73 0	34 30
Metz	33 29	49 45	Narbona	30 20	43 20
Mien Reg.	136 1	31 0	Nardenborg	47 10	67 50
Miens kow	56 41	54 50	Narue	56 10	60 0
Millaine	38 29	46 10	Naruare	21 55	42 39
Minorca Ile	34 29	40 0	Naleph	110 30	43 0
Moldauia Reg.	55 0	46 0	Natolia Reg.	66 0	41 0
Molines	30 21	47 40	Nazareth	72 40	34 10
Mollucca Ilands	160 41	1 0	Newcastle	23 10	55 20
			Nicare	59 30	39 30

N O	Longit.	Latit.	O P	Longit.	Latit.
Nicober an Iland	130 30	6 40	Orleaus	28 29	48 2
Nicomedia	63 30	44 20	Ormus Ile	93 21	26 29
Nicopolis	56 30	45 0	Orsa	59 51	54 21
Nieflot	57 40	59 50	Orsa	41 21	61 29
Nilus a Riuer	67 20	32 0	Otrona	44 29	42 40
Ninus	82 20	37 0	Otronto	49 29	40 21
Nisa	36 10	44 0	Oxenford	24 0	52 0
Nissa	45 30	50 30	Oya Reg.	75 0	13 0
Naze in Norway	31 0	58 5	Ostend	29 29	51 29
Noes a mountain	81 0	40 21	Oreuge	30 35	43 35
Nolon	30 0	40 22	Orliance	27 52	47 42
Nombre de dyos	294 29	9 22	Oldsoud	31 36	51 35
Norumbega	315 41	43 41	Orfordnes	28 0	52 15
Norweigh	35 0	62 2	P		
Nouo gradec	57 11	53 2	Paganfa	99 51	45 0 S
Nowgrod	65 29	52 41	Paito	290 30	5 10
Nowgorod	62 51	60 29	Palagofa	47 29	43 0
Nowgorod	80 2	55 21	Palandura Iland	19 8	11 0
Nubia Reg.	57 2	13 0	Palatia	60 51	39 21
Nubia a riuer.	57 2	15 41	Palma Iland	6 21	28 0 S
Nurenberg	39 29	49 29	Palona	105 10	2 0
Norwich	27 15	52 45	Pancer	120 0	41 0
O			Pambolona	24 29	42 41
O By a riuer	107 1	50 0	Panama	394 29	8 11
Occa a riuer	77 29	55 41	Pantanalia	42 50	36 29
Olant	43 29	57 0	Panuco	270 10	12 20
Olleron	24 29	45 29	Paui	270 11	12 21
Olone	24 29	47 0	Patricks purgator.	15 52	54 32
Omagua Reg.	130 1	9 0 S	Parris	29 25	48 29
Omba.	54 11	66 51	Parma	39 20	45 11
Onega a riuer	56 41	64 0	Passan	41 50	48 41
Onegaburg	59 29	62 29	Paura	37 51	46 11
Opawkow	64 29	53 29	Paznasu	155 29	45 51
Orchades Iles	22 11	59 2 S	Pechora	65 51	67 0
Orellana	343 11	3 2	Pechora Castle	73 51	64 51
Orixa Reg.	119 1	29 2	Pegu	118 0	18 21

P	Longit.	Latit.	P	Q	R	Longit.	Latit.
Peim Reg.	132	0 51 29	Port lallido			186 41	3 0 S
Perigo	323	11 43 21	Port sancto			10 0	32 29
Pernou	53	29 58 41	Por S. Vincent			337 21	23 51
Peru Reg.	296	0 10 0 S	Praga			42 29	50 0
Perusia	142	21 43 11	Presslaw			45 11	51 11
Pescara	34	29 30 11	Presslaw			46 41	49 45
Phillipina Iland	158	1 15 0	Portland			22 40	50 40
Palimbam	142	40 7 30	Primsberg			48 30	55 11
Pico	356	41 38 21	Prussia Reg.			50 0	54 0
Piccora Reg.	317	0 10 2 S	Prolamaïs			66 41	29 40
Pigmea	148	41 32 2	Punto de S. Helen			290 11	2 11 S
Pilingu	144	21 40 2	Punto de S. Helen			325 21	37 30 S
Pina	296	21 3 1	Funt de S. Lucas			152 29	23 29
Pinga	101	40 14 20 S	Pria man			118 0	0 20 S
Port de los leenes	318		Q				
Piramides	173	11 20 21	Q Vanzu			157 29	44 10
Pisa	40	29 43 41	Q Quelenfu			158 29	36 1
Pizan	73	0 51 29	Quiansu			144 41	42 20
Plata	315	0 19 51 S	Quiloa Reg.			69 51	8 51
Plimouth	21	11 50 51	Quinzay			153 0	40 1
Ploosko	48	11 52 41	Quito			293 11	0 11
Plotzko	57	29 57 41	Quitira			233 0	43 40
Podolia Reg.	59	0 49 29	R				
Poictiers	26	29 47 21	R Agufy			40 29	44 1
Poldauid	20	5 47 55	R Ramces			68 29	30 30
Polonia Reg	53	1 50 0 S	Rane			352 41	62 41
Buen Porto	177	21 2 0	Rauenna			42 21	44 21
Port de canoas	239	21 36 41	Rhodes			61 41	37 21
Port de cauolos	283	0 14 21	Ryaurech			94 41	40 0
Port de la conce	45	41 4 21 S	Ribadeo			19 21	43 21
Port desire	313	0 47 41 S	Riga			53 30	58 0
Port famin	302	51 53 11 S	Reins			30 35	49 12
Port freino	44	0 4 0 S	Riuers				
Port del gado	42	11 3 51	Rio de arboledas			331 41	1 41
Port de S. Miguell	240	29 35 2	Rio de S. August			350 0	15 30 S
Port de Negrillo	296	51 17 11	Rio de S. Barbara			326 41	34 1

R	Longit.	Latit.	R	S	Longit.	Latit.
Rio del Brasill	348	21 17 11	Rye		27 29	51 1
Rio de los camarones	42	0 5 25	Rio de senega		14 25	15 6
Rio de camaron	315	0 44 29 S	S			
Rio del campo	42	29 2 51	S Abarza		154 51	45 0
Rio de cano	298	41 33 11	S Sablestan Reg.		114 0	34 0
Rio dangla	42	29 0 41	Sabron		84 51	45 11
Rio dulce	316	29 52 0	Saendebar		174 41	35 51
Rio de S. demingo	353	0 7 51	Sagatin		95 29	58 21
Rio del estremo	340	41 22 59 S	Sala		49 41	48 0
Rio de Flores	287	19 29 0 S	Salamanca		20 29	40 51
Rio del gado	34	21 6 21	Salafta		72 41	41 51
Rio de gigantes	278	29 29 0	Salina		45 0	38 29
Rio grande	301	11 11 0	Salsburg		42 0	48 21
Rio grande	314	29 44 0	Salstom		32 21	62 0
Rio del guato	284	29 29 29	Saluado		321 21	5 0
Rio de la hacha	304	15 10 41	Samaria		72 21	47 41
Rio de S. Helena	348	41 10 29 S	Sanderfons Tow.		320 0	55 29
S. Laurence Riuer	318	51 53 0	Hope Sanderfon		326 21	72 41
Rio de manicong	48	21 10 0 S	Sandry		162 51	53 0
Rio del oro	10	21 22 29	Sanfon		20 41	43 21
Rio de palmas	272	11 14 21	S. Crux		334 21	43 29
Rio panuco	271	51 22 29	S. Davids		20 0	52 0
Rio de perla	292	29 29 0	S. Domingo		307 11	17 51
Rio de la plata	326	29 36 0	S. George		357 11	39 0
Rio primero	327	41 45 0	S. Helena		54 29	13 0 S
Rio sancto	300	29 3 0 S	Santiago		264 29	20 29
Rio de spirito san.	381	29 31 0	Santiago		298 11	32 11
The white Riuer	308	11 51 21 S	S. Iago		175 29	2 0
Rypon	35	29 55 21	S. Iohn de luz		25 11	43 21
Roan	27	41 48 51	S. Lazaro		71 0	11 21 S
Rochell	25	29 46 41	S. Lucar		21 21	37 11
Romey	42	29 42 0	S. Lucia		0 1	17 0
Roofewicke	40	21 54 0	S. Malo		24 21	47 50
Rostone	72	11 57 0	S. Maria		82 29	17 0 S
Russia	57	29 59 29	S. Maria		240 41	34 21
			S. Maria		0 19	56 0

S	Longit.	Latit.		S	Longit.	Latit.
S. Maries	85	1	44 29	Sierra leona	19	8 8 40
S. Maries of Naza	66	30	16 29	Skalholt	8	30 65 20
S. Martha	301	21	10 41	Sibier Reg.	99	20 59 30
S. Martin	321	11	51 0	Sicilia	45	0 37 30
S. Martins Iland	293	40	46 51 S	Sidon	72	10 6 30
S. Mathewes	21	11	1 51 S	Siam	140	0 13 49
S. Michell	60	50	65 29	Sina a mountaine	75	0 20 0
S. Micael	0	50	38 5	Sinus mexico	280	0 26 0
S. Miguel	327	21	47 21	Sirius persia	85	0 29 0
S. Miguel	291	41	9 11 S	Sion	59	10 12 40
S. Miguel	268	0	24 0	Sipanto	45	30 41 50
S. Miguel	249	0	32 51	Siuill	18	6 37 45
S. Nicholas	69	0	54 0	Slaba	55	50 58 41
S. Nicholas	323	21	53 41	Slauonia	47	0 45 0
S. Nicholas	2	2	17 0	Slego in Ireland	15	35 54 15
S. Petro	64	29	0 29	Slowoda	68	20 64 30
S. Pol de Lyon	20	41	48 48	Slowoda	86	30 58 51
S. Sampson	306	29	40 29	Smirna	60	21 40 29
S. Vincent	0	29	17 29	Snauell	2	30 64 21
S. Vincent	318	41	11 51	Sorlings	18	0 50 0
Sapona Iland	107	11	0 29	Spacado	46	50 45 21
Sarachy	84	29	44 11	Spier	35	30 49 21
Saragosa	26	11	41 51	Spina	60	50 43 29
Sardinia	39	0	40 0	Stad	30	40 61 41
Satyres Iland	174	11	46 30	Stapholt	2	20 65 41
Sauatapoly	75	29	47 21	Stetin	42	10 53 51
Scarborough	34	51	54 51	Stoby	52	30 44 0
Schotland	25	0	60 0	Stocholme	42	0 58 11
Scotland Reg.	20	0	57 0	Straights of Fu-	74	30 73 11
Segedin	49	0	47 11	machin		
Seames	19	29	48 21	Seuedia Reg.	40	0 60 0
Senega Reg.	13	0	24 0	Sumatra an Iland	134	0 0 0
Sernety Reg.	106	29	33 29	Soor	84	45 23 5
Shabolisher	83	41	56 29	Surrat	99	24 21 7
Shahaskik	91	29	53 0	Swally wad	99	32 21 25
Shrewsbury	22	35	52 55	Saldania bay	39	45 33 40

S	T	Longit.	Latit.		T	V	Longit.	Latit.			
Silly		18	0	5	70	Ioures	27	30	47	50	
Stert		22	50	50	40	Trent	40	10	26	10	
Swineburne head		25	0	59	51	Triago an Iland	278	40	21	0	
Syria		74	0	39	0	Tribanta	63	30	41	50	
Siracusæ		45	41	37	0	Trinidad	355	20	19	10	S
Southampton		24	5	51	11	Trinidad	295	50	21	20	
T						Trinidad	119	20	9	0	
T Aranto		48	0	40	29	Trinity harbor	08	30	36	0	
Tarapaca		306	21	30	41	Tripolis antiqua	44	21	30	20	
Tarbacan		109	29	34	51	Tripolis in Barba.	45	21	30	30	
Targa Reg.		32	0	25	0	Tripolis soria,	72	21	37	0	
Taragona		29	29	40	41	Troia	59	0	42	30	
Tarso		71	21	40	0	Troy	31	0	48	10	
Tartar		152	0	63	21	Tuna	41	51	64	30	
Tartaria Reg.		130	0	62	0	Turson	131	30	56	30	
Tasken Reg.		129	0	49	0	Tyrus	71	35	35	30	
Tatracan		55	0	44	51	Tzeroas	79	50	49	20	
Tecou		116	29		41	Talao	159	0	3	30	
Tenariffe		8	11	27	29	Ternate	160	12	0	30	
Tendue Reg.		170	0	59	0	Tidore	160	15	0	10	
Tenesab		46	41	61	11	Timor	139	12	10	26	S
Terceta		358	23	39	0	V					
Terra alta		160	29	6	51	V Alentia	29	20	39	41	
Terra alta		45	21	15	21	V Varcano	107	50	39	0	
Ter de los fumos		322	29	40	21	Varon	83	30	70	30	
Tharsis		115	21	49	0	Vaygats an Iland	81	30	69	21	
Thessalonia		53	44	44	21	Venice	41	40	45	51	
Texell in Holand		31	0	53	15	Verma.Reg.	133	0	21	30	
Thoulouse		28	40	43	50	Varona	40	40	45	50	
Thunnis		67	40	32	0	Viana	17	30	42	0	
Tygris a Riuer		84	0	34	30	Viatca	87	50	59	30	
Tocros		54	50	46	0	Vienna	45	30	48	30	
Togora		146	0	49	50	Villa longa	28	20	7	40	
Tolledo		22	20	39	40	Ville conde	17	30	41	30	
Tollon		34	5	43	20	Virginia	302	10	36	0	
Toul		33	10	49	10	Vishgrad	61	30	51	30	

V W	Longit.	Latit.	W X Y Z	Longit.	Latit.
Bona vista	4 30	15 30	Wologda	73 50	59 29
Buena vista	308 40	40 11	Wologda	74 30	60 0
Bucna vista	177 30	13 30			
Vlm	37 50	48 50	X		
Volga a riuer	75 40	58 0			
Vpsalia	42 50	60 0	Xaques	282 0	20 29
Vigis a riuer	85 50	53 20			
Visting	79 30	61 30	Y		
W			Y Armouth	27 30	53 0
			Yorke	23 30	54 29
W Aersberghen	39 1	57 30	Yuagua	303 30	21 0
Ward house	50 30	70 26	Yuch cope.	22 56	56 20
Earle Warwicks foreland	323 11	62 1	Z		
Waterford	17 15	52 16	Z Acana a riuer	60 40	13 0 S
Count Warwicke found	330 41	64 41	Zacatula	269 40	20 0
Wakefield	23 48	53 45	Zacoton an Iland	88 0	12 51
Wassilgorode	81 50	56 41	Zama	49 30	14 0 S
Waxon	49 20	52 29	Zama	74 41	11 41
Weimouth	23 50	51 0	Zeilam	104 0	8 0
Welichy	96 30	56 0	Zanhaga Reg.	20 0	24 0
Weliki poyassa	101 20	63 29	Zanziber	73 52	5 29 S
Welifz	63 40	59 51	Zara	46 25	45 41
Weroy	39 50	68 41	Zaradrusa a riuer	126 0	94 0
Wesel	21 29	51 29	Zauan	41 29	51 0
Westerhold	40 29	67 41	Zedica	48 0	29 29
Whitbay	24 29	55 0	Zegzeg Reg.	36 41	14 41
Wiborough	56 29	62 35	Noua Zembla	83 29	74 0
Wight Ile	25 11	50 29	Zinguis	76 11	49 29
Sr. Hugh Willoby Iland	55 0	75 0	Zoidalanel	137 31	3 51 S
Winterton	27 20	53 29	Zuenziga Reg.	25 0	25 0

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